

HEAT CONTROLLER

SERVICE MANUAL

DVC/DVH 09/12/18/24

Inverter Single Zone

Ductless Mini-Split

Comfort-Caire[®]
AITONS EQUIPMENT

A  Company

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WARNING

- Installation MUST conform with local building codes or, in the absence of local codes, with the National Electrical Code NFPA70/ANSI C1-1993 or current edition and Canadian Electrical Code Part1 CSA C.22.1. Where conflicts exist, the local and/or national codes shall prevail.
- The information contained in the manual is intended for use by a qualified, licensed service technician familiar with safety procedures and equipped with the proper tools and test instruments
- Installation or repairs made by unqualified persons will void the warranty and may cause hazards or incorrect operation.
- Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

1. Precaution

1.1 Safety Precaution

■ To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage.

■ Before service the unit, be sure to read this service manual at first.

1.2 Warning

➤ Installation

■ Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.

There is risk of fire or electric shock.

■ For electrical work, contact the dealer, seller, a qualified electrician, or an authorized service center.

Do not disassemble or repair the product, there is risk of fire or electric shock.

■ Always ground the product.

There is risk of fire or electric shock.

■ Install the panel and the cover of control box securely.

There is risk of fire or electric shock.

■ Always install a dedicated circuit and breaker.

Improper wiring or installation may cause electric shock.

■ Use the correctly rated breaker of fuse.

There is risk of fire or electric shock.

■ Do not install, remove, or reinstall the unit by yourself (customer).

There is risk of fire, electric shock, explosion, or injury.

■ Be caution when unpacking and installing the product.

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

■ Take care to ensure that power cable could not be pulled out or damaged during operation.

There is risk of fire or electric shock..

■ Do not touch (operation) the product with wet hands..

■ Do not allow water to run into electrical parts or the unit.

It may cause fire, failure of the product, or electric shock.

■ Do not store or use flammable gas or combustible materials near the product.

There is risk of fire or failure of product.

■ Do not use the product in a tightly closed space for a long time.

Oxygen deficiency could occur.

■ If abnormal noises or smoke comes from product, turn the breaker off or disconnect the power supply cable.

There is risk of electric shock or fire.

■ Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the is equipped with one .)

There is risk of physical injury, electric shock, or product failure..

■ Turn the main power off when cleaning or maintaining the product.

There is risk of electric shock.

■ When the product will not be used for a long period of time, turn off the circuit breaker.

There is risk of product damage or failure, or unintended operation.

➤ CAUTION

■ Always check for refrigerant leakage after installation or repair of product.

Low refrigerant levels may cause operational failure.

■ Install the drain hose to ensure that water is drained away properly.

Improper installation may cause water leakage and damage to personal property.

- **Keep the unit level even when installing the product.**

This helps to avoid vibration or water leakage.

- **Do not install the product where it will be directly exposed to seaside wind (salty air).**

It may cause corrosion on the product.

Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➤ **Operational**

- **Do not block the inlet or outlet of air flow.**

- **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**

There is risk of fire, electric shock, or damage to the plastic parts of the product.

- **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**

- **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

- **Do not insert hands or other objects through air inlet or outlet while the product is operated.**

- **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different brands of batteries.**

There is risk of fire or explosion.

- **If battery acid from the batteries gets onto your skin or clothes, wash it well with clean water and contact your local poison control center. Do not use the remote of the batteries have leaked.**

2. Part Identification and Functions

2.1 Model Numbers of Indoor/Outdoor units

Capacity	Indoor Units	Outdoor Units
9KBTU/H	B-DVH09SD-0 / B-DVC09SD-0	A-DVH09SD-0 / A-DVC09SD-0
12KBTU/H	B-DVH12SD-0 / B-DVC12SD-0	A-DVH12SD-0 / A-DVC12SD-0
18KBTU/H	B-DVH18SD-1 / B-DVC18SD-1	A-DVH18SD-1 / A-DVC18SD-1
24KBTU/H	B-DVH24SD-1 / B-DVC24SD-1	A-DVH24SD-1 / A-DVC24SD-1

2.2 Required Clearances for Indoor and Outdoor units

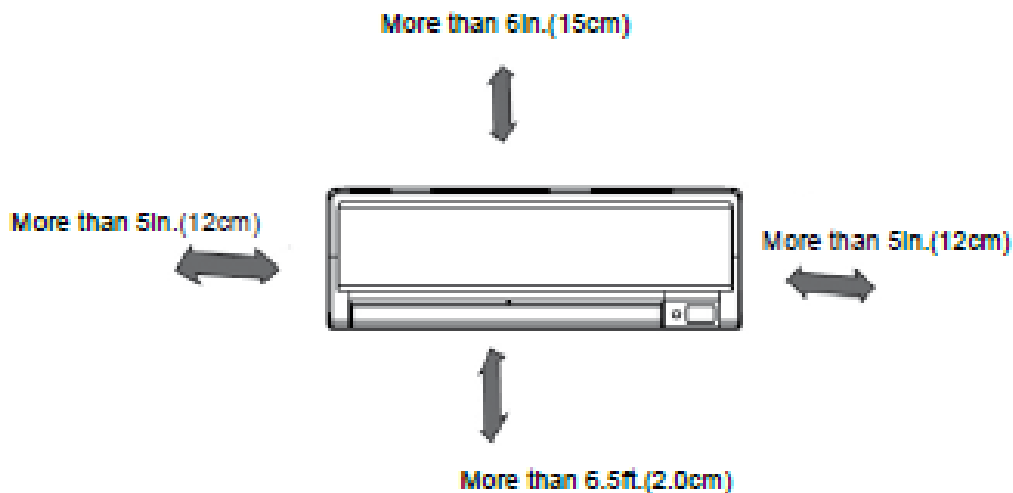
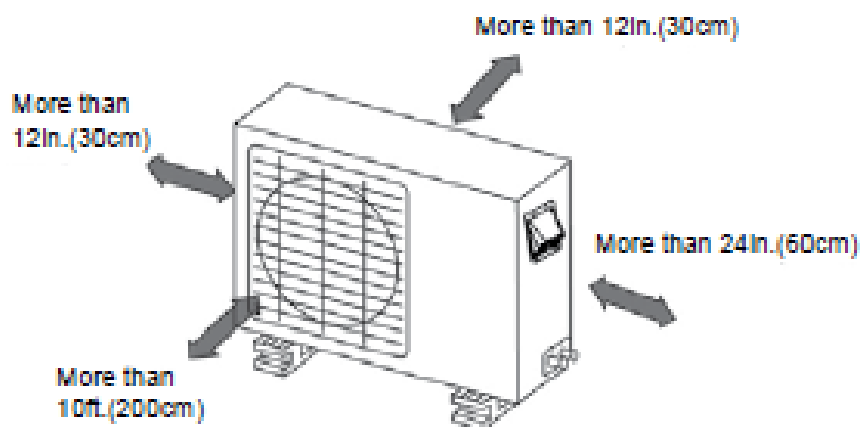
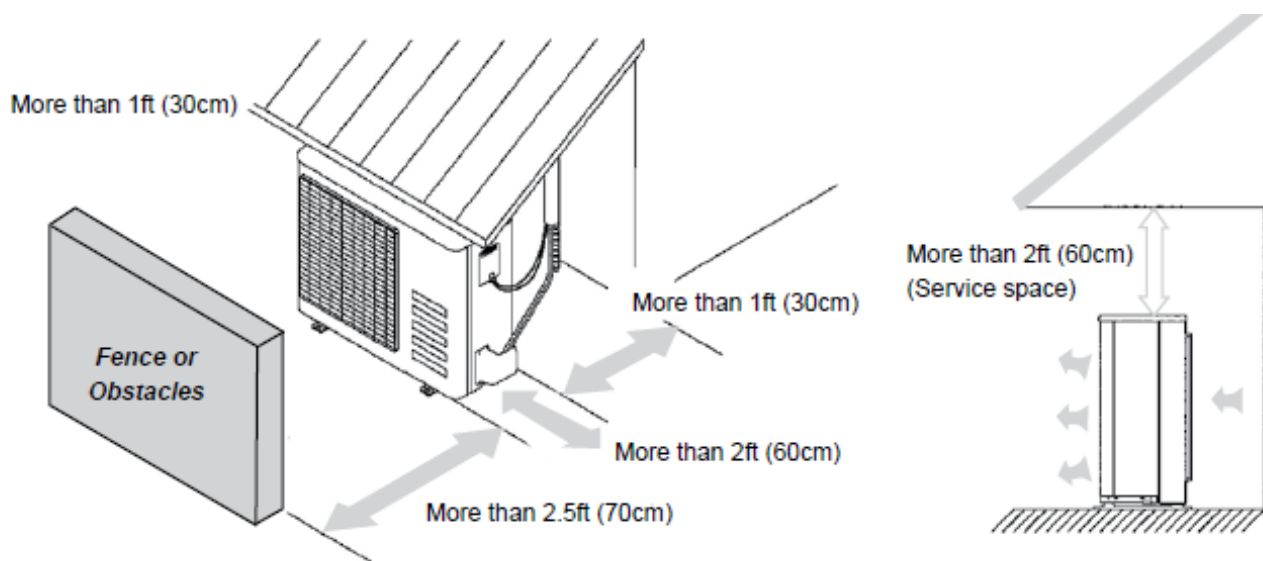


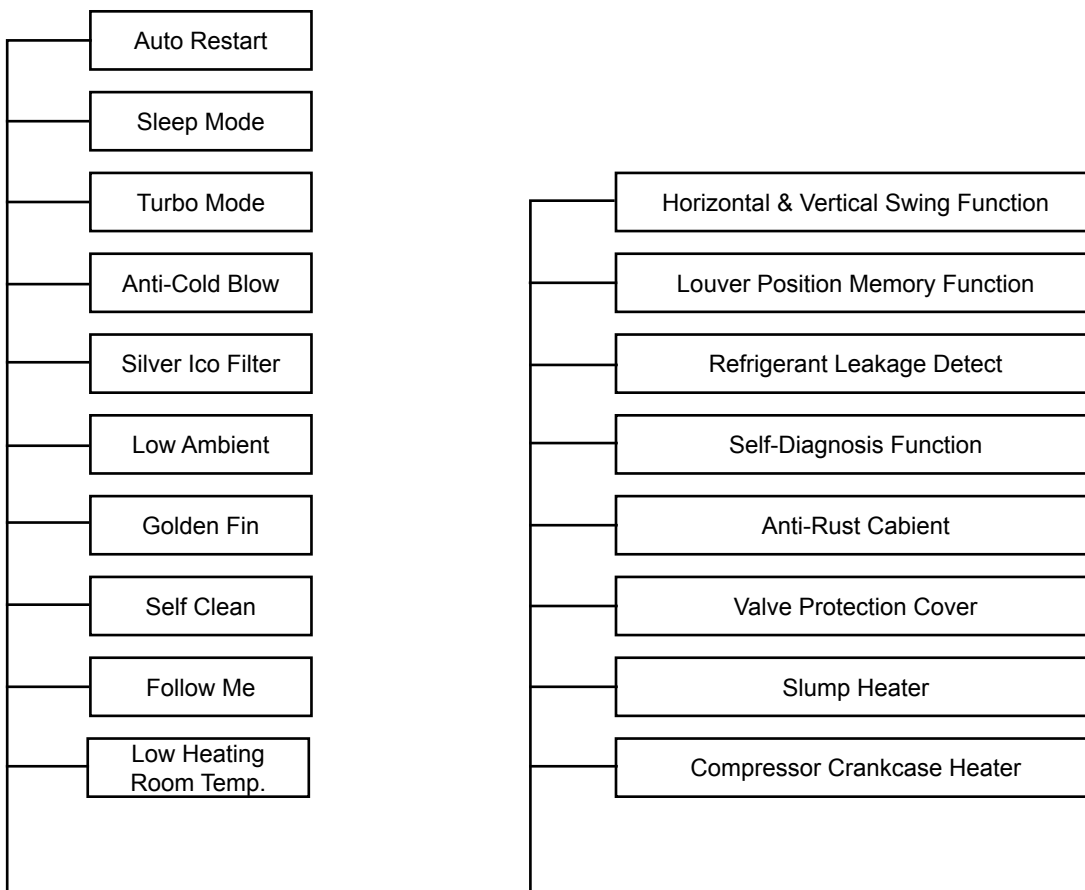
Fig. 1





2.3 Features

Note: For Reference Only. Your model may differ and is subject to change.



2.3.1 Description of Features and Functions

- **Auto-Restart:**

The unit will memorize the set conditions before a power failure and resume operation automatically when the power re-starts.

- **Sleep Mode:**

This feature helps keep the room conditions at the most desirable levels when you sleep.

- **Turbo Mode:**

Turbo mode allows the unit to quickly heat or cool and room, at a high speed fan setting.

- **Anti-Cold Blow:**

In heating mode, this feature prevents cold air from blowing until warm air is ready to be delivered.

- **Silver Ion Filter:**

The silver filter sterilizes bacteria in the air stream by decomposing cell wall of bacteria.

- **Low Ambient Operation:**

Allows the unit to operate under low outdoor temperatures.

- **Gold Hydrophilic Condensers Fin Coating:**

This coating improves the heating efficiency by accelerating the defrosting process. The anticorrosive gold coating on the condenser helps withstand salty air and corrosive elements for sea side applications.

- **Self Clean:**

This function wicks away any moisture, essentially cleaning the inside of indoor unit to prevent bacteria from forming. This feature is especially useful at the end of the season and/or when the unit will not be used for an extended period of time.

- **Follow me:**

A temperature sensor is built in the remote control, which signals the unit to automatically change the operation mode to supply a comfortable temperature. Using this feature allows the unit to sense the conditions where you are in the room, rather than up high in the room where it traditionally senses the conditions via the indoor unit.

- **Low Room Temperature Protection:**

Allows the unit to maintain a set temperature to protect the area it is installed in from freezing when you will be away for an extended period of time in the winter.

- **Louver Swing and Position Memory:**

The louvers can swing to make a breeze like effect in the air flow from the indoor unit. When starting the unit after shutting down, the louver will restore the user's settings for louver position.

- **Refrigerant Leak Detection:**

The refrigerant leakage detect function prevents the unit from freezing due to low charge and protects the compressor from being damaged.

- **Self-Diagnosis Function:**

The system monitors itself for abnormal operations and turns off the unit automatically to protect it from further damage, then displays an error code to help troubleshoot the problem for a quick solution.

- **Sump Heater:**

A PTC heater is installed in the base pan of the outdoor unit to prevent the rain, snow or defrosted water from accumulating and icing up the unit.

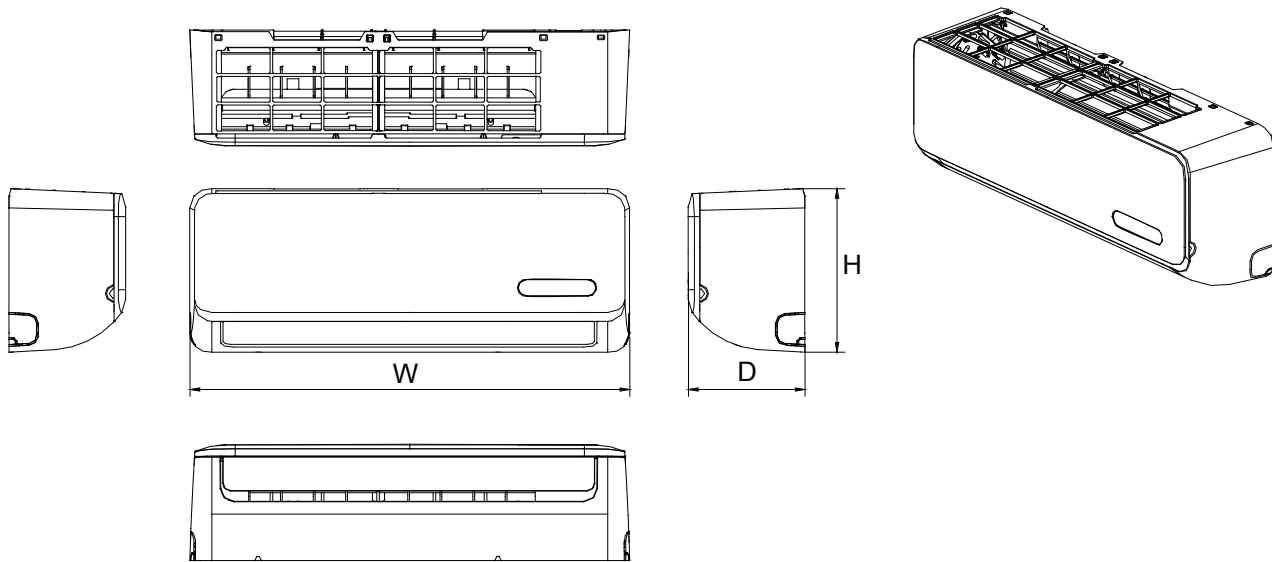
- **Compressor Crankcase Heater:**

The oil dissolves easily into the refrigerant, especially in low temperature condition, therefore the crankcase heating belt is used to warm the bottom of the compressor to avoid pumping out too much oil within the refrigerant, which helps to protect the compressor.

3. Dimensional Data

3.1 Indoor Unit

Note: The drawings below are only for reference. Actual dimensions may be different and are subject to change.

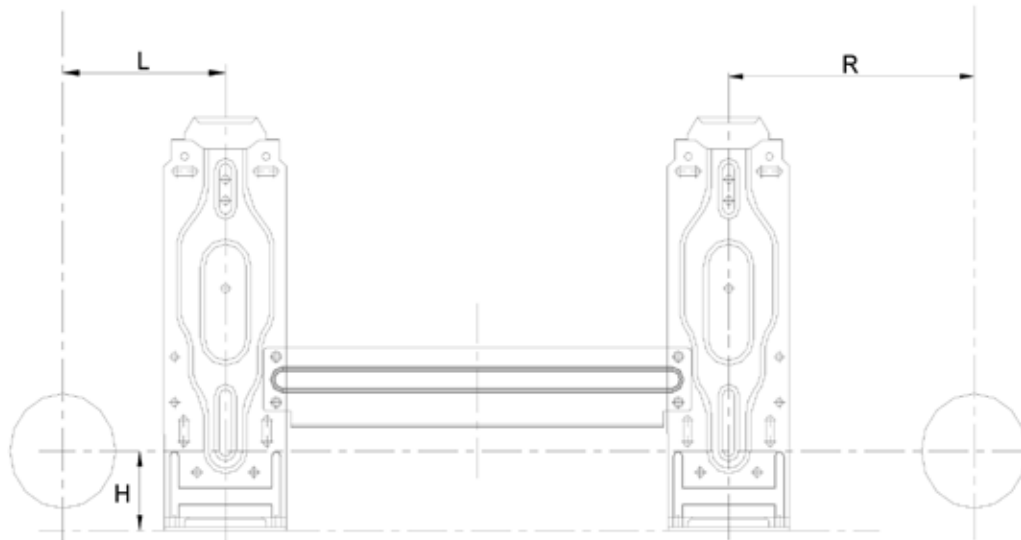


Note: The above drawing is only for reference. The dimensions of your actual unit may be different and are subject to change.

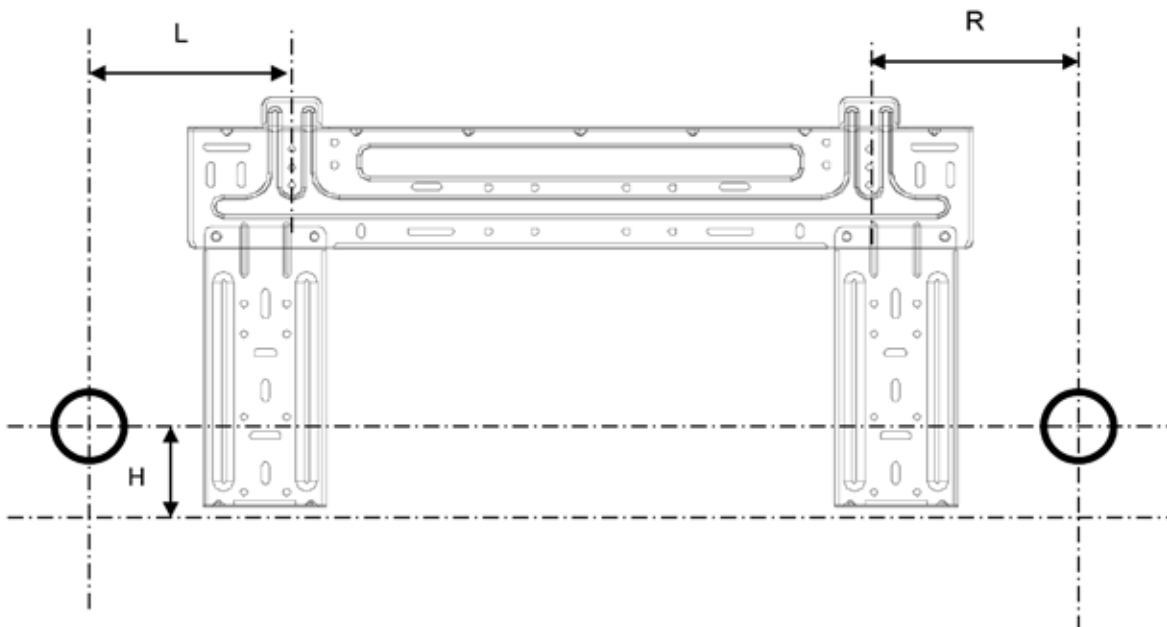
Model	W	D	H
B-DVC09SD-0	26.8in	7.0in	10.0in (255mm)
B-DVH09SD-0	(680mm)	(178mm)	
B-DVC12SD-0	30.3in	7.4in	10.8in (275mm)
B-DVH12SD-0	(770mm)	(188mm)	
B-DVC18SD-1	35.6in	7.8in	12.4in (315mm)
B-DVH18SD-1	(905mm)	(198mm)	
B-DVC24SD-1	40.6in	8.6in	12.4in (315mm)
B-DVH24SD-1	(1030mm)	(218mm)	

3.2 Indoor Unit Mounting Bracket

Note: The drawings below are only for reference. Actual dimensions may be different and are subject to change.



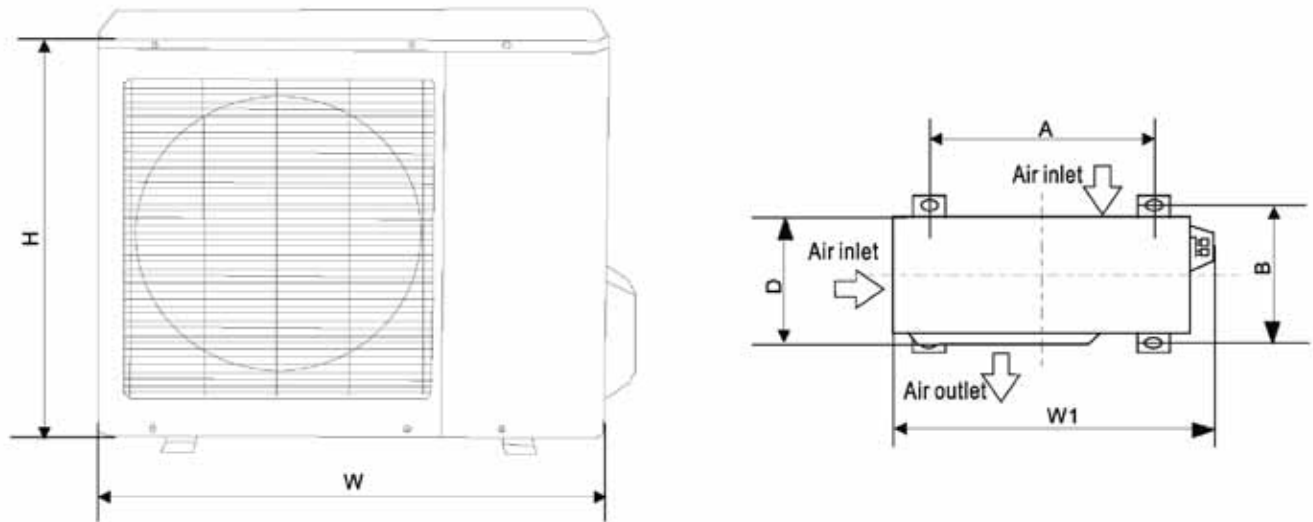
Model	R	L	H	Hole Diameter
B-DVC/DVH09	3.6in(92mm)	6.7in (170mm)	1.8in (45mm)	Φ2.56in (65mm)
B-DVC/DVH12	3.7in(95mm)			
B-DVC/DVH18	3.1in(80mm)	3.9in(100mm)		



Model	R	L	H	Hole Diameter
B-DVC/DVH24	6.4in(163mm)	11.5in(293mm)	1.8in(45mm)	Φ2.56in(65mm)

3.3 Outdoor Unit

Note: The drawings below are only for reference. Actual dimensions may be different and are subject to change.

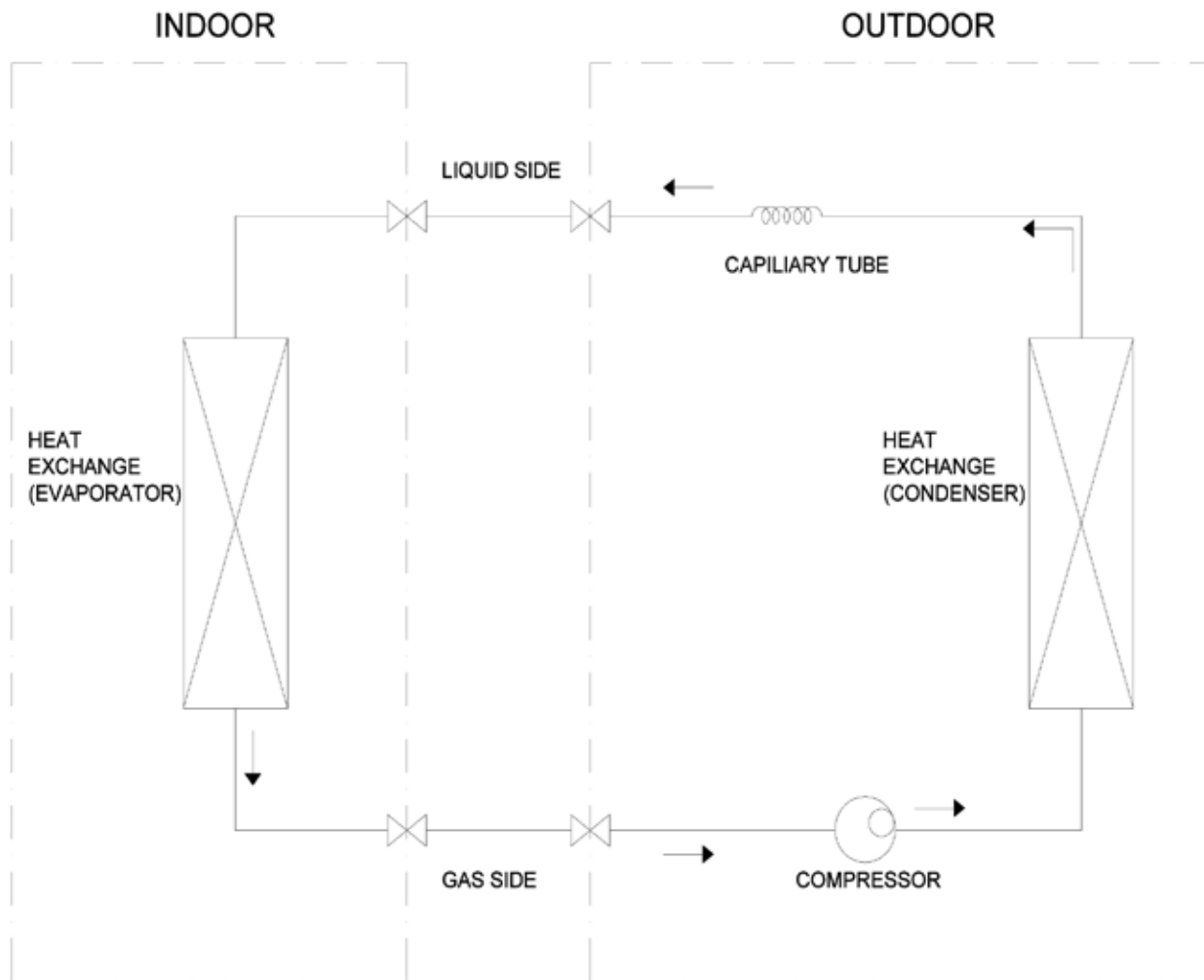


Note: The above drawing is only for reference. The dimensions of your actual unit may be different and are subject to change.

Model	W	H	D	W1	A	B
A-DVC/DVH09 A-DVC/DVH12	26.0in (660mm)	10.5in (265mm)	21.25in (540mm)	28.8in (732mm)	18in (458mm)	10.9in (276mm)
A-DVC/DVH18	30in (760mm)	11.25in (285mm)	23.2in (590mm)	32.5in (823mm)	20.9in (530mm)	11.5in (290mm)
A-DVC/DVH24	33.3in (845mm)	12.5in (320mm)	27.6in (700mm)	35.7in (908mm)	22in (560mm)	13.2in (335mm)

4. Refrigerant Cycle Diagram

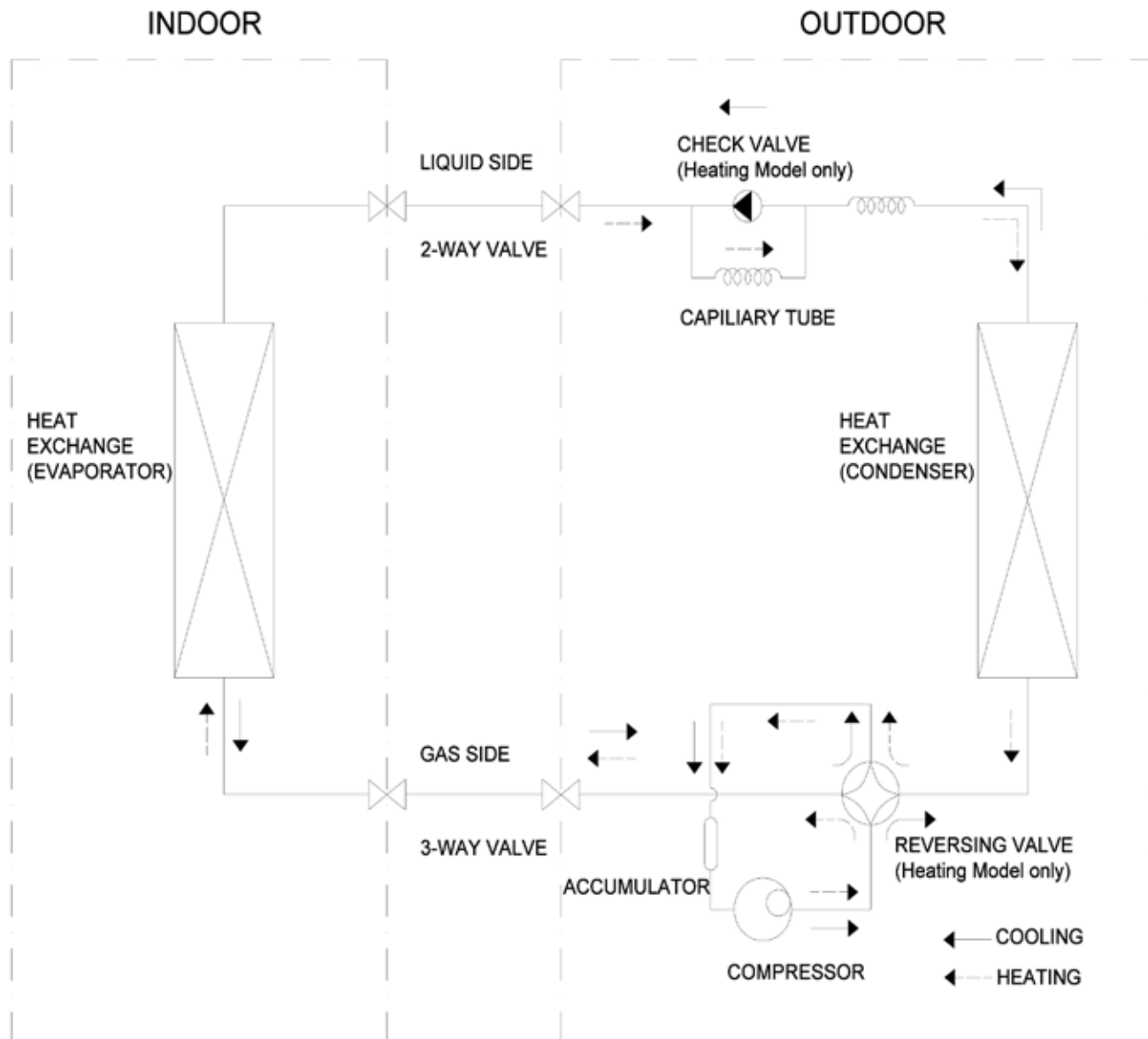
4.1 Cooling Only Models (DVC):

**ATTENTION:**

Units can be pumped down for service and recharged.

- A servicer can pump down the refrigerant into the outdoor unit for maintenance or replacement of the indoor unit.
- Also the entire system can be evacuated for maintenance or replacement of the outdoor unit.

4.2 Heat Pump Models (DVH):



ATTENTION:

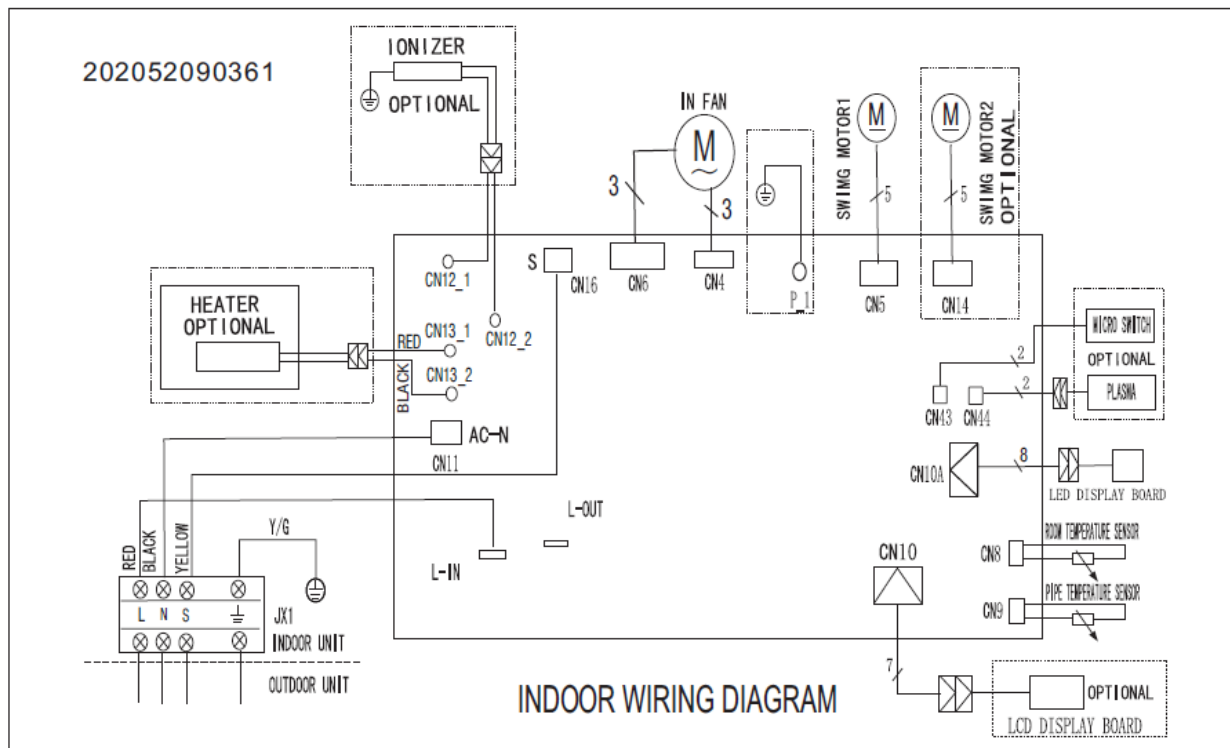
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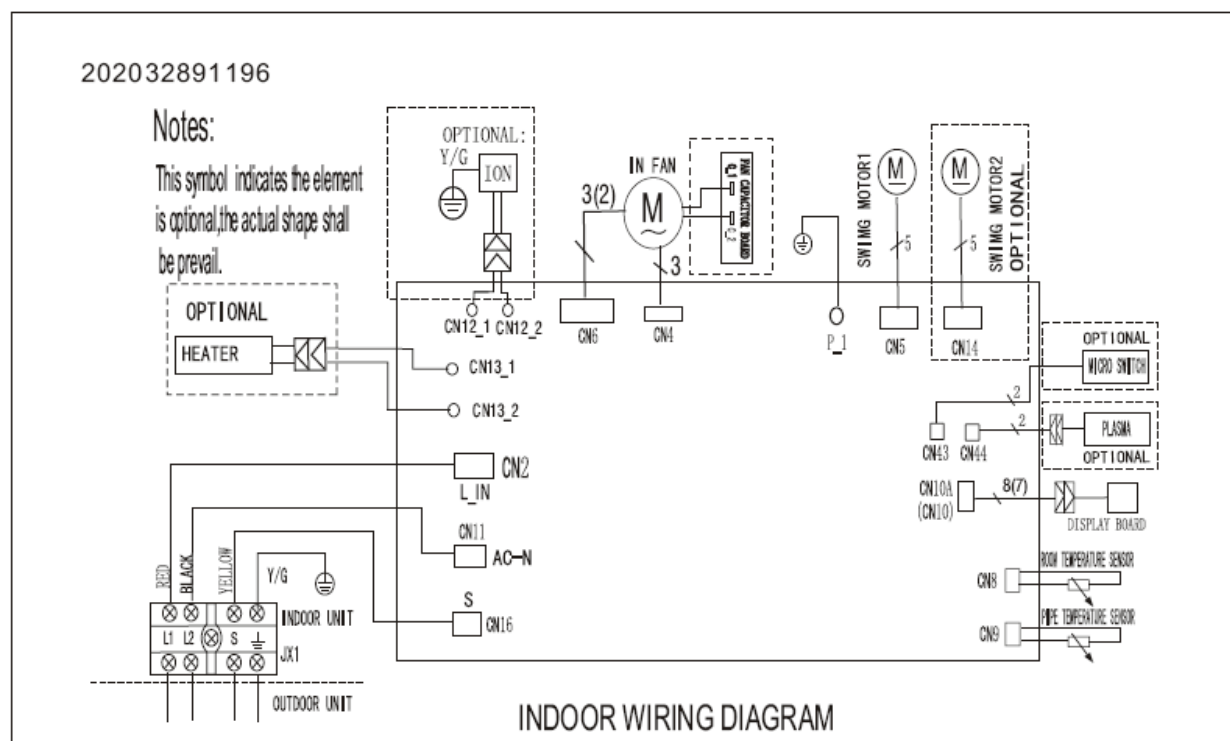
5.0 Wiring Diagrams:

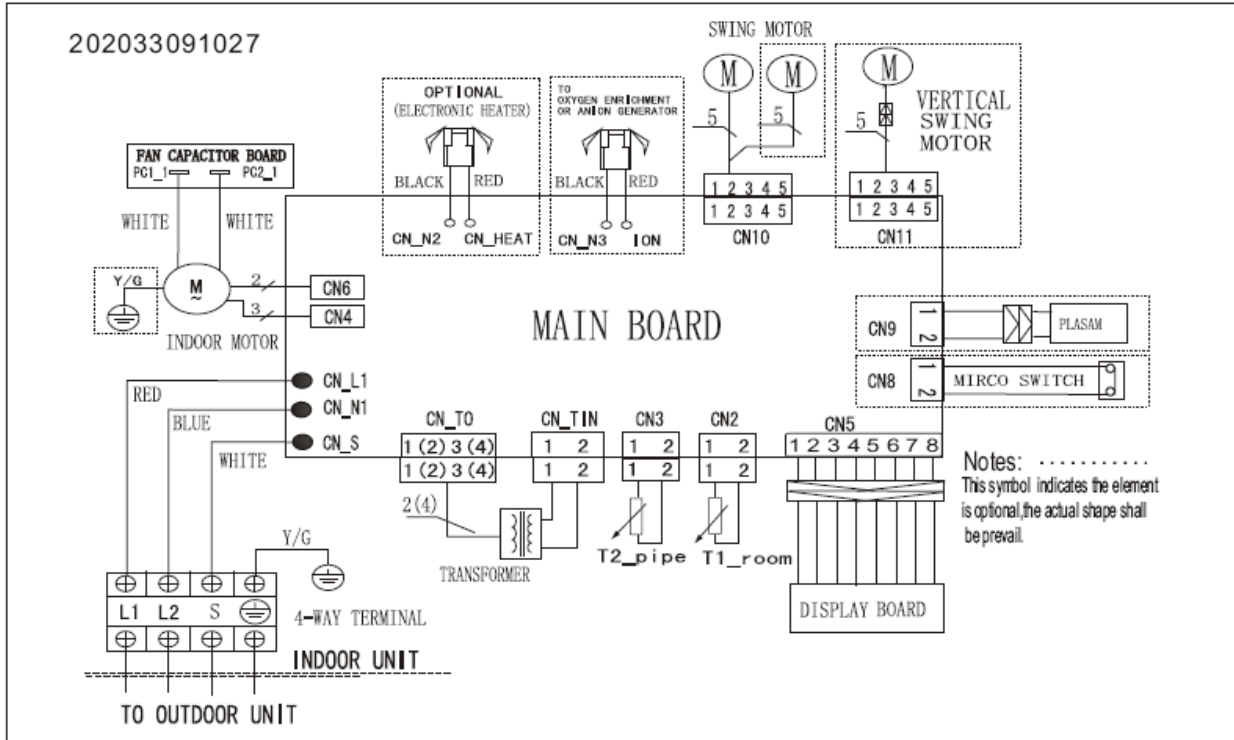
5.1 Indoor Units:

B-DVC09SD-0, B-DVH09SC-0, B-DVH12SD-0, B-DVH12SD-0



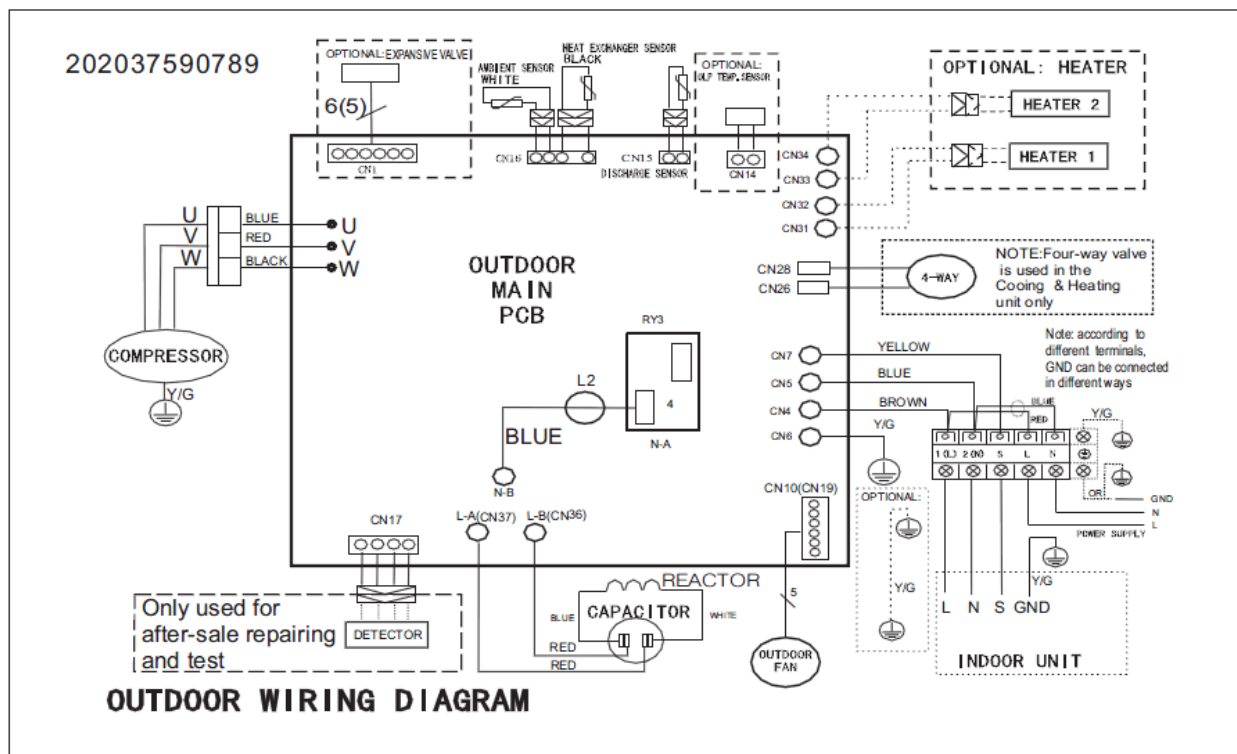
B-DVC18SD-1, B-DVH18SD-1



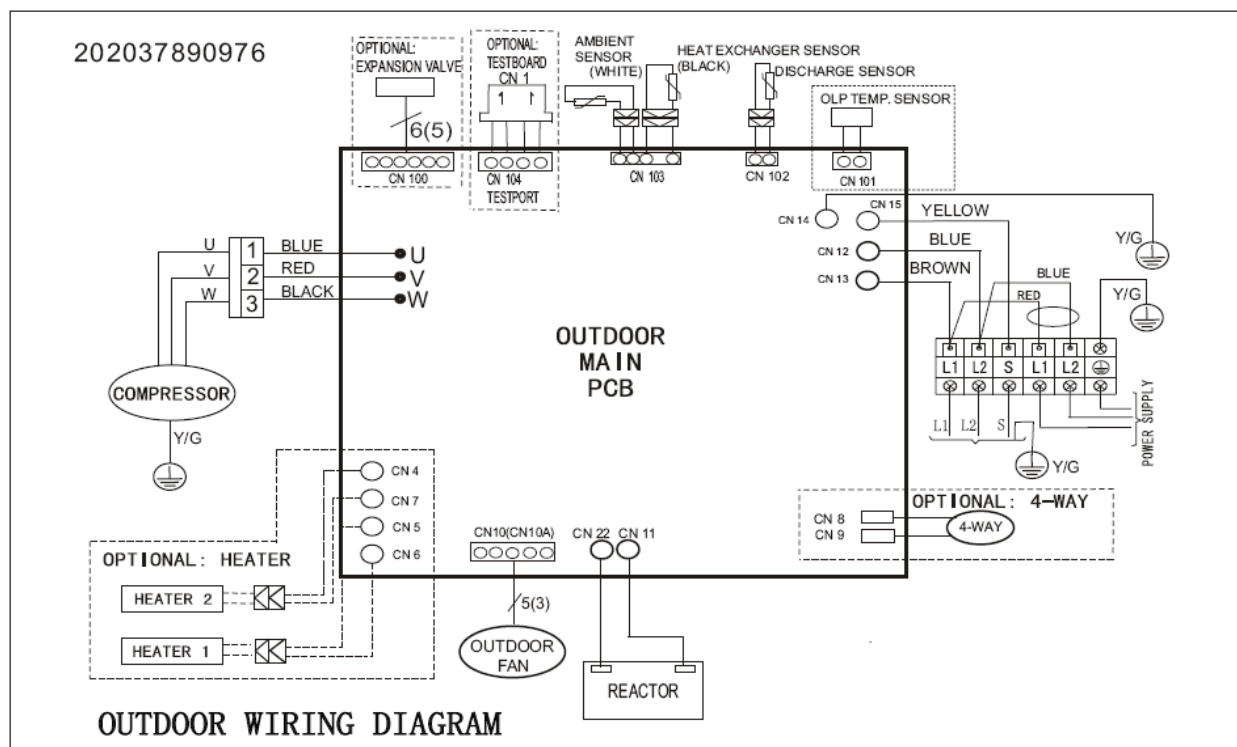
B-DVC24SD-1, B-DVH24SD-1

5.2 Outdoor Units

A-DVC09SD-0, A-DVH09SD-0, A-DVC12SD-0, A-DVH12SD-0



A-DVC18SD-1, A-DVH18SD-1



6 Installation Details

6.1 Electrical

All electrical wiring must be done according to local codes. Additionally installations in the USA, must conform to the current National Electric Code (NEC) and Installations in Canada must conform to current Canadian Electric Code (CEC).

Nameplate data indicates the operating voltage, phase, ampacity, maximum over current protection, and minimum voltage.

The contractor is to provide an individual branch circuit for over current protection for the unit as required by code. Some codes may require a disconnect between the indoor and outdoor unit. Run power supply wiring through a weatherproof disconnect box and conduit to the unit connection. Disconnects are required to be within sight and easy reach of the unit (usually within 3 feet).

Circuit breakers and disconnect switches should be properly sized based on the required codes and the unit's nameplate requirements.

Check the unit wiring diagram for the number of conductors required. Ensure that the proper AWG (gauge) and type of wire is used to comply with code and the unit's nameplate.

Route neatly and protect from sharp edges and damage. Inadequate wiring and/or improper electrical supply will likely result in failure of the compressor and other electrical components and voids the warranty.

6.2 Line Set Connection Sizes

Models	Connection Size	
	Gas	Liquid
DVC09SD-0 / DVH09SD-0	3/8in (9.52mm)	1/4in (6.35mm)
DVC12SD-0 / DVH12SD-0 DVC18SD-1 / DVH18SD-1	1/2in (12.7mm)	1/4in (6.35mm)
DVC24SD-1 / DVH24SD-1	5/8in (15.9mm)	3/8in (9.52mm)

6.3 Line Set Lengths and Elevations

Models	Max. Elevation	Max. Length
DVC/DVH09SD-0	26ft (8m)	66ft (20m)
DVC/DVH12SD-0 DVC/DVH18SD-1		
DVC/DVH24SD-1	33ft (10m)	82ft (25m)

*Minimum pipe length must not be less than 10 feet.

** Trap rises every 10 feet (5-7m) with a 'p' trap when outdoor unit is mounted above the indoor unit.

6.4 Field Charging:

Condensing units are factory charged for the outdoor and indoor unit with 25ft. (7.6m) of refrigerant lines. Charge must be added for the interconnecting tubing.

These units should be critically charged to ensure proper performance. Some systems may require additional charging of refrigerant, depending on line set lengths.

$$R = T \times (L - 25)\text{ft}$$

R(oz): Additional refrigerant to be charged
L(ft): The length of the refrigerant line
T(oz): The quantity of the charged refrigerant per additional foot.

Model	09, 12, 18	24
oz/ft	0.2	0.4

7. Operating Conditions

Indoor (Room) Temperature	Cool Mode	Heat Mode	Dry Mode
	≥62°F(17°C)	≤86°F(30°C)	> 50°F(10°C)
Outdoor (Ambient) Temperature	5°F - 122°F (-15°C - 50°C)	5°F - 86°F (-15°C - 30°C)	32°F - 122°F (0°C - 50°C)

CAUTION:

1. If the unit is used outside of the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.
2. If the room relative humidity is greater than 80%, the surface of the indoor unit may attract condensation. To lessen the chance for condensate dripping, set the vertical air flow louver to its maximum angle (vertically to the floor) and set the fan mode to HIGH.

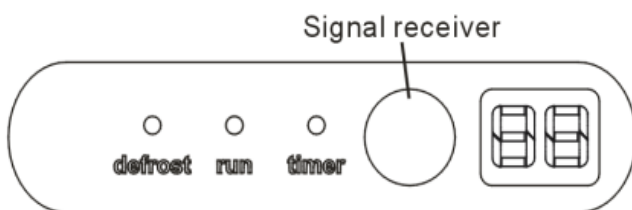
8. Electronic Display Functions


8.1 Abbreviations

- T1: Indoor room temperature
 T2: Coil temperature of evaporator
 T3: Coil temperature of condenser
 T4: Outdoor ambient temperature
 T5: Compressor discharge temperature
 Ts: Temperature Set Point

8.2 Display functions

8.2.1 Icon Identification on indoor display board.



Defrost	This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode
Run	Flashes when the unit is in standby. Illuminates a solid light when the unit is on.
Timer	This indicator illuminates when TIMER is set ON/OFF.
	Temperature indicator Displays the temperature settings when the unit is operational, also displays any error codes for diagnosis and troubleshooting.
Signal Receiver	Receives the signal from the remote control.

8.3 Main Protection

8.3.1 Compressor Three Minute Time Delay

There is a 1 minute delay the 1st time the unit is started-up, then a 3 minute delay each time the unit is started up after the 1st time.

8.3.2 Compressor Top Temperature Protection

The unit will stop working when the top of the compressor temperature is reached, and will restart after the compressor top temperature protector restarts.

8.3.3 Compressor Discharge Temperature Protection

When the compressor discharge temperature is getting high, the frequency of the compressor will be limited as stated below:

When the compressor discharge temperature $T5 > 239^{\circ}\text{F} (115^{\circ}\text{C})$ for 5s, the compressor will stop. However, when the temperature is between $226.4^{\circ}\text{F} (108^{\circ}\text{C}) < T5 < 239^{\circ}\text{F} (115^{\circ}\text{C})$, the compressor frequency will decrease to the lowest level every 3 minutes. Then when the temperature is $194^{\circ}\text{F} (90^{\circ}\text{C}) < T5 < 221^{\circ}\text{F} (105^{\circ}\text{C})$, the compressor will keep running at the current frequency. When $T5 < 194^{\circ}\text{F} (90^{\circ}\text{C})$, there will be no limit on the compressor frequency.

8.3.4 Out of Control Fan Speed

When Indoor Fan Speed runs at 300RPM or lower, for a designated period of time, the unit will stop running and the appropriate error code will show on the display.

8.3.5 Inverter Module Protection

The Inverter module has protection features regarding current, voltage and temperature. If these any of these are abnormal, the corresponding error code will display on indoor unit and the unit will stop working.

8.3.6 Indoor fan delayed open function

When the unit starts up, the louver will be active immediately, but the indoor fan will not start for 10s. If the unit is in heating mode, the indoor fan will be also controlled by anti-cold wind function to eliminate cold blow.

8.3.7 Compressor Crankcase Heater

If the outdoor ambient temperature $T_4 < 38^\circ\text{F}$ (3°C) and the unit connects to a new power supply or if the compressor has stopped for over 3 hours, the crankcase heater will turn on. When $T_4 > 41^\circ\text{F}$ (5°C) or the compressor starts running, the crankcase heater will turn off.

8.3.8 Zero Crossing Detection Error

If the unit detects a time interval is not correct for a continuous 240s, the unit will stop and the LED will display the appropriate error code. The correct zero crossing signal time interval should be between 6-13ms.

8.4.2.9 Condenser temperature protection

131°F (55°C) $< T_3 < 140^\circ\text{F}$ (60°C), the compressor frequency will decrease until it

reaches level F1 and will continue to run at this level. When $T_3 < 129^\circ\text{F}$ (54°C), the compressor will keep running at the current frequency.

However, if $T_3 < 126^\circ\text{F}$ (52°C), the compressor will not limit the frequency and resume to the former frequency based on demand. But, if $T_3 > 140^\circ\text{F}$ (60°C) for 5 seconds, the compressor will stop until $T_3 < 126^\circ\text{F}$ (52°C).

8.4.2.10 Evaporator temperature protection

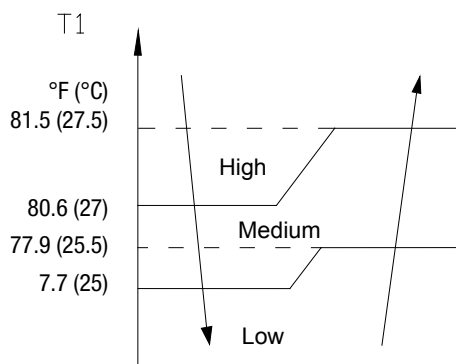
When $T_2 < 32^\circ\text{F}$ (0°C), the compressor will stop and will restart when $T_2 \geq 41^\circ\text{F}$ (5°C).

At 32°F (0°C) $\leq T_2 \leq 39^\circ\text{F}$ (4°C), the compressor frequency will be limited and decreased to the lower level. However when the temperature is 39°F (4°C) $\leq T_2 \leq 45^\circ\text{F}$ (7°C), the compressor will keep the current frequency. At $T_2 > 45^\circ\text{F}$ (7°C), the compressor frequency will not be limited.

9.0 Operation Modes and Functions

9.1 Fan Only Mode

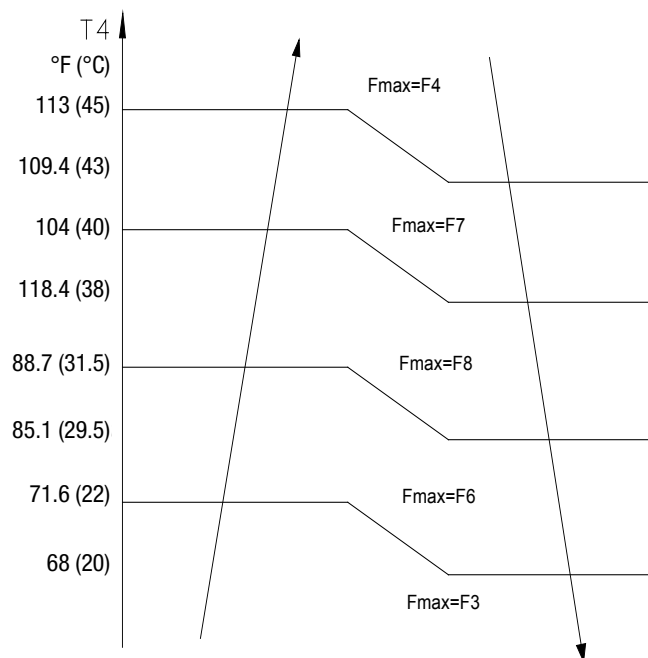
In Fan only mode, the outdoor fan and compressor stop running. The temperature setting function is disabled and no setting temperature is displayed on the indoor unit. The Indoor fan can be set to high/med/low/auto in fan only mode. The louver will operate the same as it does in cooling mode. When the fan only mode is placed in Auto Mode, it operates as shown below:



9.2 Cooling Mode

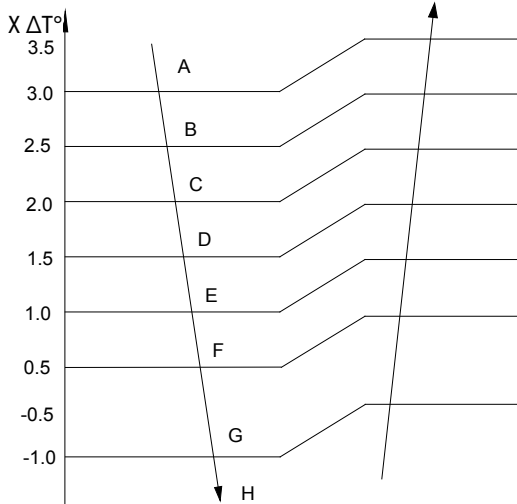
9.2.1 Compressor Operation-Cooling Mode

The maximum operating frequency (F_{max}), follows the chart below based on the outdoor ambient temperature T_4



However, if the unit is turned on using the remote control, the compressor will run at the Fmax frequency for 7 minutes according to the outdoor ambient temperature T4. But after 7 minutes, the operation will take into account the difference (ΔT) in indoor room temperature (T1) and the Set Point Temperature (Ts) and the compressor frequency will operate as follows:

$$\Delta T = T1 - Ts$$



The zones (A,B,C...H) shown on the chart above correspond to the various compressor running frequencies as a result (ΔT) of the difference between T1-Ts. When the temperature differential (ΔT) of T1-Ts remains in the same zone for 3 minutes, the compressor will run as follows:

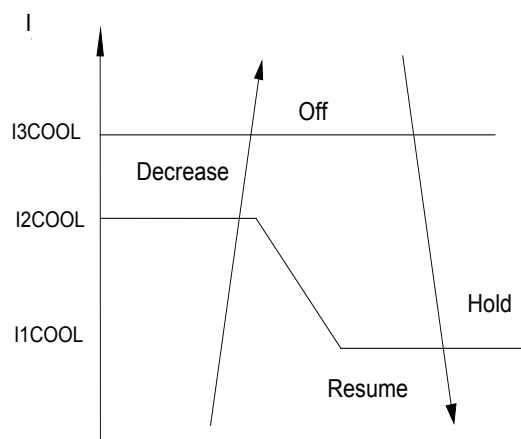
In zones A thru E the ΔT is between 3.5 and 1 Degree, the compressor will continue to increase the frequency until it reaches its highest level where Fmax=F8.

In zone F, the compressor continues to run at its current frequency when the temperature differential (ΔT) is between 0.5 and 1 degree. Once the temperature differential (ΔT) falls below 0.5 degrees, the compressor's frequency will decrease until it reaches the lowest level where Fmax=F1.

In zone H, where the ΔT is -1 degree or less, the compressor will run at the lowest frequency where Fmax=F1 for 1hour.

However, when the temperature differential (ΔT) is less than -2 degrees, the compressor will stop.

Additionally, the compressor running frequency is always limited by the current. Therefore, the running currents also must be taken into account. I3COOL, I2COOL, and I1COOL refer to different running current values in the table below.

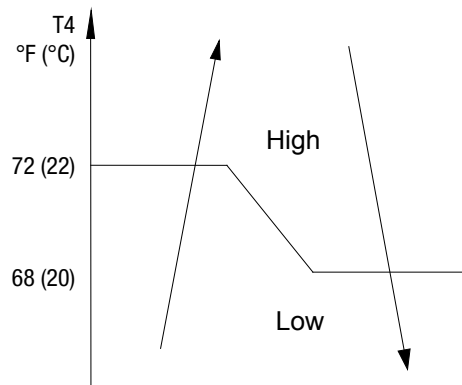


Indoor units	I1COOL (Amps)	I2COOL (Amps)	I3COOL (Amps)
B-DVC09SD-0	13.0	14.0	15.0
B-DVH09SD-0	13.0	14.0	15.0
B-DVC12SD-0	13.0	14.0	15.0
B-DVH12SD-0	13.0	14.0	15.0
B-DVC18SD-1	10.0	11.0	13.0
B-DVH18SD-1	10.5	11.5	13.0
B-DVC24SD-1	12.0	13.0	14.0
B-DVH24SD-1	12.0	13.0	14.0

If the running current is too high (above I3COOL) in the "Off" zone of the chart above, the compressor will stop. Between I3COOL and I2COOL, in the "Decrease" zone the compressor will lower the frequency to the lowest level. The "Hold" zone allows the compressor to continue to run at the current frequency. **Note:** When the unit is in "hold" zone for 3 minutes, the compressor frequency will rise to the next highest level. This rise in frequency can occur twice at most while in this zone. The "Resume" zone places no limitation on the frequency.

9.2.2 Outdoor Fan Operation - Cooling Mode

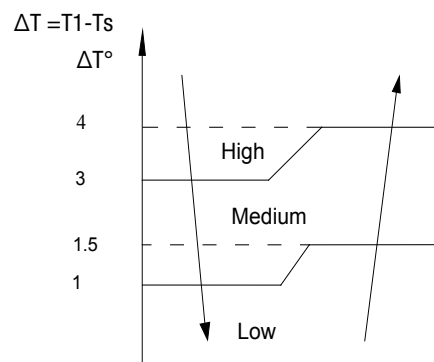
The outdoor fan operates based on the Outdoor Ambient Temperature (T4):



When the outdoor ambient temperature T4 is above 78°F (22°C), the outdoor fan runs high speed, however when the temperature is below this, the fan speed decreases to low and continues to run at low speed when the temperature is 68°F (20°C) or below.

9.4.2.3 Indoor Fan Operation-Cooling Mode

In cooling mode, indoor fan runs all the time and the speed can be set to high, medium, low or auto. When the fan is placed in auto mode, while the unit is in cooling mode, the auto fan operation takes into account the difference (ΔT) in indoor room temperature (T1) and the set point temperature (Ts):

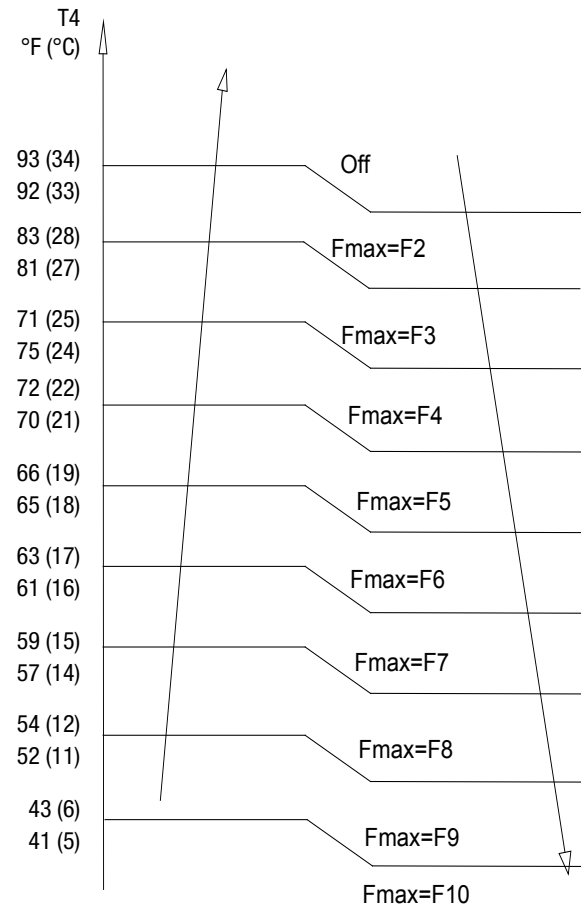


When there is a 3 to 4 degree difference (ΔT) in set and room temperatures, the fan runs high speed. When the difference in temperature (ΔT) is between 1 and 3 degrees, the fan speed is medium. However, as the room temperature begins to get closer to the set temp, within 1 degree or less temperature differential (ΔT), the fan speed will run on low.

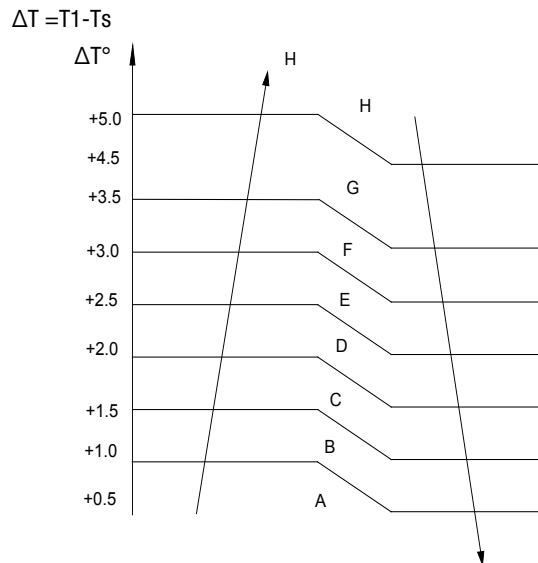
9.3 HEATING MODE

9.3.1 Compressor Operation-Heating Mode

The maximum operating frequency (Fmax), follows the chart below based on the outdoor ambient temperature T4:



However, if the unit is turned on using the remote control, the compressor will run at the Fmax frequency for 7 minutes according to the outdoor ambient temperature T4. But after 7 minutes, the operation will take into account the difference (ΔT) in indoor room temperature (T1) and the Set Point Temperature (Ts) and the compressor frequency will operate as follows:



The zones (A,B,C...H) shown on the chart above correspond to the various compressor running frequencies as a result (ΔT) of the difference between T1-Ts. When the temperature differential (ΔT) of T1-Ts remains in the same zone for 3 minutes, the compressor will run as follows:

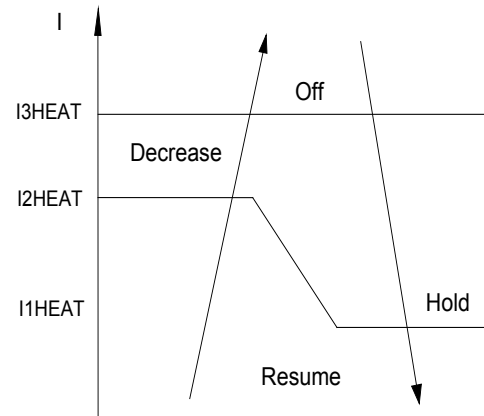
When the ΔT is between 0.5 and 2.5 Degrees, in zones A thru E, the compressor frequency will increase until it reaches the highest level Fmax=F10.

In zone F, where the ΔT is 3 Degrees, the compressor will continue to run at the current frequency.

Once the ΔT is between 3.5 and 5 degrees in zone G, the compressor will decrease the frequency to its lowest level where Fmax=F1. When ΔT is above 5 Degrees in the H zone, the compressor will continue to run at Fmax=F1 for 1 hour.

When ΔT is greater and 6 degrees, the compressor will stop.

Additionally, the compressor running frequency is always limited by the current. Therefore, the running currents also must be taken into account. I3HEAT, I2HEAT, and I1HEAT refer to various running current values, see chart.

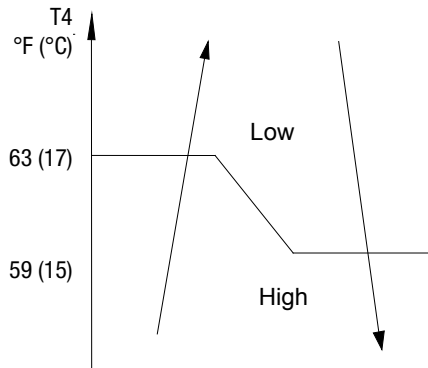


Indoor Unit	I1HEAT (Amps)	I2HEAT (Amps)	I3HEAT (Amps)
B-DVC09SD-0	6.5	7.5	8.5
B-DVH09SD-0	14.0	15.0	16.0
B-DVC12SD-0	6.0	7.0	8.0
B-DVH12SD-0	14.0	15.0	16.0
B-DVC18SD-1	9.0	10.0	11.0
B-DVH18SD-1	10.5	11.5	13.0
B-DVC24SD-1	11.0	12.0	13.0
B-DVH24SD-1	12.0	13.0	14.0

If the running current is too high (above I3HEAT) in the “Off” zone of the chart above, the compressor will stop. Between I3HEAT and I2HEAT, in the Decrease zone, the compressor will lower the frequency to the lowest level. The “Hold” zone allows the compressor to continue to run at the current frequency. **Note:** When the unit is in “hold” zone for 3 minutes, the compressor frequency will rise to the next highest level. This rise in frequency can occur twice at most while in this zone. The “Resume” zone places no limitation on the frequency.

9.3.2 Outdoor Fan Operation-Heating Mode

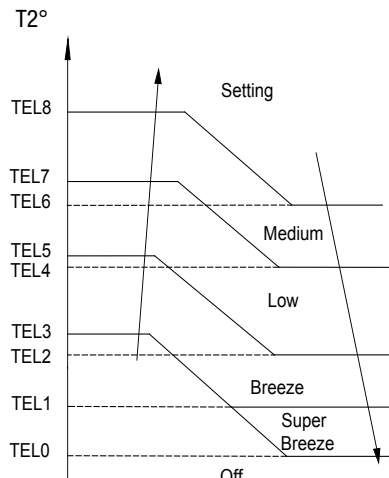
The outdoor fan operates based on the Outdoor Ambient Temperature (T4):



When the outdoor ambient temperature T4 is above 63°F(17°C), the outdoor fan runs low speed, however when the temperature is below this, the fan speed increases to high and continues to run at high speed when the temperature is 63°F(17°C) or below.

9.3.3 Indoor Fan Operation-Heating Mode

The indoor fan runs based on the evaporator coil temperature (T2) as follows:



TEL0	TEL1	TEL2	TEL3	TEL4	TEL5	TEL6	TEL7	TEL8
75°F (24°C)	83°F (28°C)	90°F (32°C)	95°F (35°C)	97°F (36°C)	102°F (39°C)			111°F (44°C)

Notes:

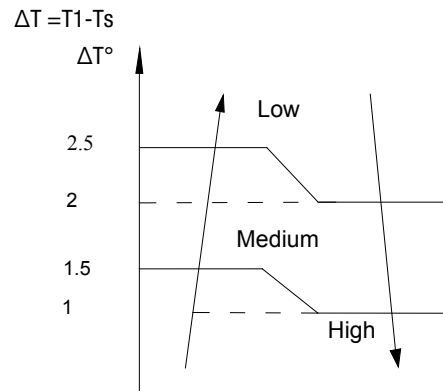
- If the compressor stops due to the room temperature rising, the indoor fan will be

forced to run for 127seconds in breeze mode. During this period, the anti-cold-wind is disabled.

- If the unit runs in forced operation mode, the indoor fan will run with rating speed and the anti-cold-wind function is disabled.

9.3.3.1 Auto Fan Operation-Heating Mode

When the fan is placed in auto mode, while the unit is in cooling mode, the auto fan operation takes into account the difference (ΔT) in indoor room temperature (T1) and the set point temperature (Ts):



The indoor fan will run at low speed when the ΔT is greater than 2.5Degrees, medium speed when the ΔT is between 2.5 and 1.5 degrees, and high speed between 1.5 and 1 degrees or less.

9.4 Defrost Mode

9.4.1 Defrosting Conditions:

When $T4 > 32^\circ\text{F}(0^\circ\text{C})$, if the following two items are satisfied, the units start defrosting:

- $T3 < 38^\circ\text{F}(3^\circ\text{C})$ for 40 minutes and T3 remains lower than $21^\circ\text{F}(-6^\circ\text{C})$ for more than 3 minutes.
- $T3 < 38^\circ\text{F}(3^\circ\text{C})$ for 80 minutes and T3 remains lower than $25^\circ\text{F}(-4^\circ\text{C})$ for more than 3 minutes.

When $T4 < 32^\circ\text{F}(0^\circ\text{C})$, both the first and second conditions are satisfied, then the program will determine if T2 has decreased more than $41^\circ\text{F}(5^\circ\text{C})$ or not. When T2 has decreased more than $41^\circ\text{F}(5^\circ\text{C})$, the unit enter the defrost mode.

However, no matter what value T4 is, if the unit runs with $T3 < 38^{\circ}\text{F} (3^{\circ}\text{C})$ for more than 120 minutes and T3 remains lower than $29^{\circ}\text{F} (-2^{\circ}\text{C})$ for more than 3 minutes, the unit will enter defrosting mode whether or not T2 drops more than $41^{\circ}\text{F} (5^{\circ}\text{C})$ or not.

9.4.2 Ending Defrosting Operation:

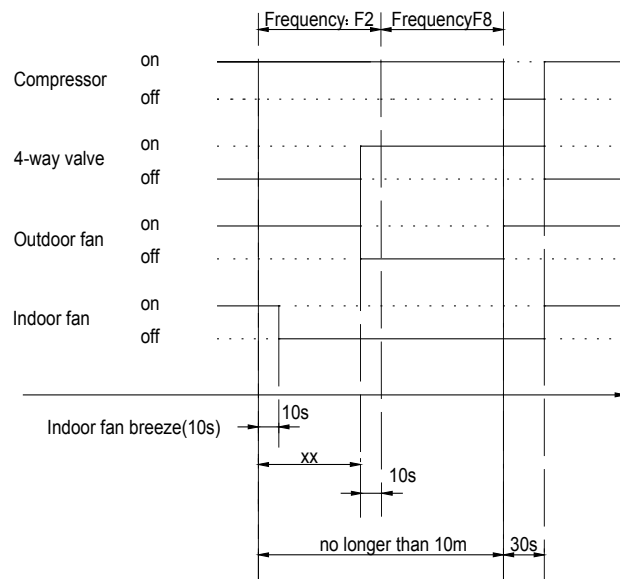
If any one of the following items is satisfied, the defrost operation will end and the unit will return to normal heating mode.

- T3 rises to be higher than TCDE1.
- T3 remains higher than TCDE2 for 80 seconds.
- The unit has run in defrosting mode for 10 minutes.

Indoor units	TCDE1	TCDE2
B-DVC/DVH 09, 12	$54^{\circ}\text{F} (12^{\circ}\text{C})$	$47^{\circ}\text{F} (8^{\circ}\text{C})$
B-DVC/DVH 18, 24	$59^{\circ}\text{F} (15^{\circ}\text{C})$	

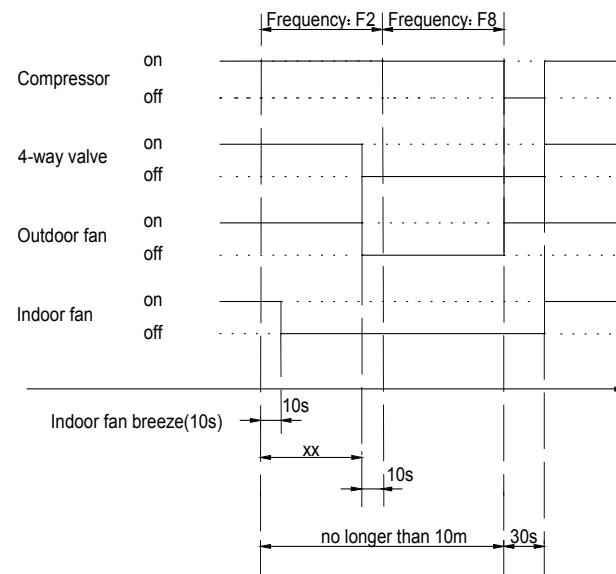
9.4.3 Defrosting Process:

DVC/DVH 9K,12K:



Where xx= 60seconds.

DVC/DVH 18K, 24K:



Where xx=60seconds for 18K model

Where xx=90seconds for 24K model

9.5 Evaporator Coil Temp. Protection

When $T2 > 140^{\circ}\text{F} (60^{\circ}\text{C})$, the compressor will turn off, but will restart when $T2 < 119^{\circ}\text{F} (48^{\circ}\text{C})$. When $T2 > 128^{\circ}\text{F} (53^{\circ}\text{C})$, the compressor frequency will decrease to a lower level and runs at this level for 20seconds to protect the unit. When the frequency decreases to $F_{\text{max}} = F2$ and $T2 > 128^{\circ}\text{F} (53^{\circ}\text{C})$ for 3 minutes, the compressor will turn off. However, when the coil temperature lowers to $T2 < 119^{\circ}\text{F} (48^{\circ}\text{C})$ or T2 remains at $119^{\circ}\text{F} (48^{\circ}\text{C})$ for 6 minutes, the frequency will not be limited by the evaporator coil temperature (T2).

9.6 Auto-Mode

This mode can be selected using the remote control. The set temperature (T_s) can be changed between $63-86^{\circ}\text{F} (17-30^{\circ}\text{C})$. In auto mode, the machine will choose the mode according to ΔT , where $\Delta T = T1 - T_s$:

$\Delta T = T1 - T_s$	Auto Mode Function:
$\Delta T > 1^{\circ}$	Cooling
$-1^{\circ} < \Delta T \leq 1^{\circ}$	Fan-only
$\Delta T \leq -1^{\circ}$	Heating

Indoor fan will run in auto fan mode and the louver will operate based on the mode selected automatically (Heat, Cool, Fan-Only).

Notes:

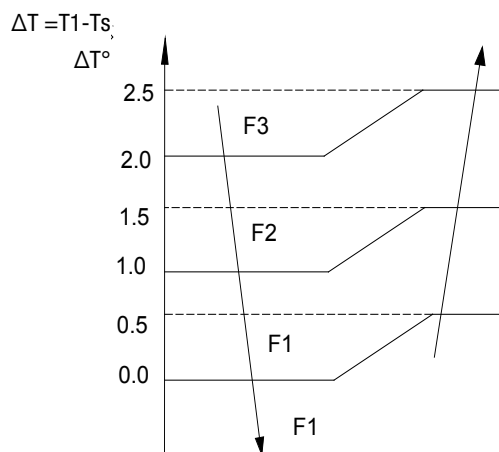
- If the unit switches between heating and cooling modes automatically, the compressor will stop for 15 minutes and re-select the mode according to the ΔT conditions.
- If the setting temperature is modified, the machine will choose running function again based on ΔT .

9.7 Dry mode

9.7.1 Dry Model Fan Speed and Louver Function

Indoor fan speed is fixed at breeze speed and can't be changed. The louver angle will operate the same as it does in cooling mode.

9.7.2 Compressor Operation in Dry Mode



In Dry mode, the compressor's frequency will decrease from F3 to F1, as the temperature difference (ΔT) between indoor room temperature (T_1) and the Set point temperature (T_s) decreases from 2.5 to 0 Degrees.

9.7.3 Low Room Temperature Protection

In dry mode, if room temperature is lower than 50°F(10°C), the compressor will stop and will not resume operation until room temperature exceeds 54°F(12°C).

9.7.4 Additional Protections in this Mode:

Evaporator anti-freezing, condenser high temperature protection and Compressor

frequency and Outdoor fan are all limited in the same method that they would be in the cooling mode.

9.8 Forced Operation

Note: See *Forced Operation information in the Installation instructions.*

When the unit is off, pressing the AUTO/COOL button on the indoor unit, under the main cover panel, will force the unit into auto mode. If the AUTO/COOL button is pressed again within 5 seconds of the first time it was pushed, the machine will go into forced cooling mode. Pressing the AUTO/COOL button again, any time after 5 seconds of the first time it was pushed, will turn off the unit. In forced operation mode, all general protections and remote control are available.

9.8.1 Operation rules:

Forced cooling mode:

The compressor will run at $F_{max}=F_2$ frequency and indoor fan runs in breeze mode. After running for 30 minutes this way, the unit will then run in auto mode with 75°F(24°C) set temperature (T_s). **Note:** See *Auto-Mode section of this manual for more information.*

9.9 Timer function

9.9.1 Timer Range

The timer range is 24 hours and is relevant time, which means it is the time that has elapsed from the time the timer is set.

9.9.2 Timer On

The unit will turn on automatically when the Timer On set time is reached.

9.9.3 Timer Off

The unit will turn off automatically when the timer off set time is reached.

9.9.4 Timer On/Off

The unit will turn on automatically when the Timer On set time is reached and then the unit will automatically turn off when the timer off set time is reached.

9.9.5 Timer Off/On

The unit will turn off automatically when the timer off set time is reached and then

automatically turn on when the Timer On set time is reached.

9.9.6 Mode within Timer Function

The timer function will not change the current operation mode.

9.10 Sleep Mode

9.10.1 Sleep Mode Duration

Sleep mode operates for 7 hours when it is activated. After 7 hours, the unit turns off.

9.10.2 Sleep Mode Operation

When sleep mode is activated while the unit is in cooling mode, the set temperature rises 1° every hour for 2 hours. After 2 hours, the set temperature stops rising and indoor fan is fixed at low speed.

When sleep mode is activated while the unit is in heating mode, the set temperature decreases 1° every hour for 2 hours. After 2 hours, the set temperature stops rising and indoor fan is fixed at low speed (Anti-cold wind function will still have the priority).

9.10.3 Timer Function in Sleep Mode

The Timer function is still available during sleep mode. When the timer off is set for less than 7 hours while in sleep mode, the sleep mode will stop once the set time off is reached.

However, if the timer off is set for more than 7 hours, the unit will not stop operating until reaches the set time in sleep mode.

9.11 Auto-Restart Function

In case of a sudden power failure, the unit will memorize the set conditions before the power failure. When the power returns, the unit will resume its previous operation settings (except for the swing function) automatically after 3 minutes.

9.12 Automatic panel function

The panel will automatically move to the closing direction at an angle of 50° when the unit is receiving power, and this action is not affected by any signal from remote control.

9.12.1 Panel Operation when Powering On

When the unit is turned on, the panel is opened automatically at an angle of 50° and then the horizontal louver will open.

9.12.2 Panel Operation when Powering Off

When the unit is turned off, the panel is closed automatically at an angle of 50° and then the horizontal louver will close.

9.12.3 Panel Interference

If the panel is being closed when the horizontal louver is still moving, the unit will stop the horizontal louver from moving and allow the panel to move first. After this, the horizontal louver will continue its previous movement.

9.13 47°F(8°C) Heating

Note: This is an optional feature and may not be present on your actual model.

In heating operation, the set temperature of the unit can be set as low as 47°F(8°C) in order to keep the room temperature above freezing when the house is unoccupied for an extended period of time in severe cold weather.

10. Troubleshooting

10.1 Indoor Unit Error Codes

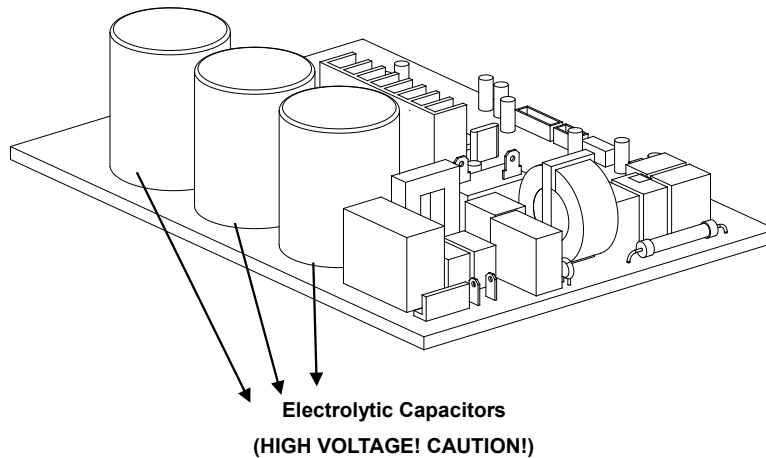
KEY: ☆ = Flashing Light X = Light is Off O= Solid Light is On

Operation	Timer	Display	Error:
☆ 1 time	X	E0	Indoor unit EEPROM parameter error
☆ 2 times	X	E1	Communication Error between indoor and outdoor unit
☆ 3 times	X	E2	Zero-crossing signal detection error
☆ 4 times	X	E3	Indoor fan speed is out of control
☆ 5 times	X	E4	T1 Indoor room temperature sensor has an open or short circuit
☆ 6 times	X	E5	T2 Evaporator coil temperature sensor has an open or short circuit
☆ 7 times	X	EC	Refrigerant leakage detection error
☆ 2 times	O	F1	T4 Outdoor temperature sensor has an open or short circuit
☆ 3 times	O	F2	T3 Condenser coil temperature sensor has an open or short circuit
☆ 4 times	O	F3	T5 Compressor discharge temperature sensor has an open or short circuit
☆ 5 times	O	F4	Outdoor unit EEPROM parameter error
☆ 1 times	☆	P0	IPM malfunction or IGBT over-strong current protection error
☆ 2 times	☆	P1	Over voltage or over low voltage protection error
☆ 3 times	☆	P2	High temperature protection of compressor top
☆ 5 times	☆	P4	Inverter compressor drive error

10.2 Outdoor Unit Errors and Trouble shooting

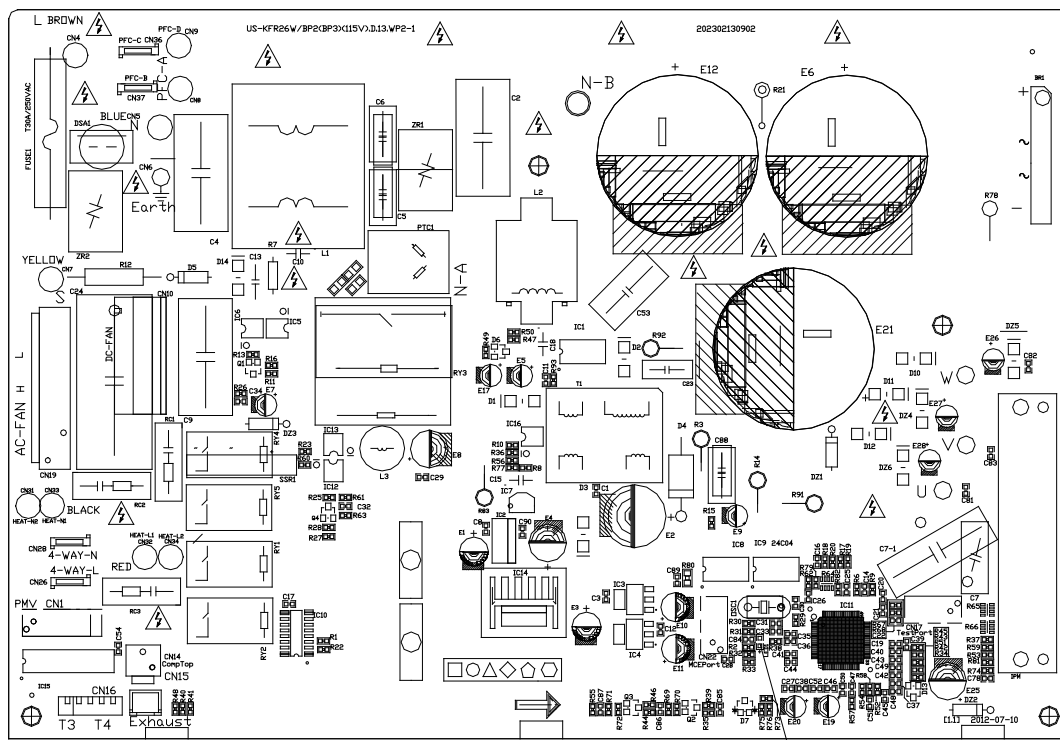
WARNING: Risk of Electrical Shock

Discharge the power in the capacitors on the board (if it contains electrolytic capacitors):



Note: All images are for reference only, they may vary from your particular model.

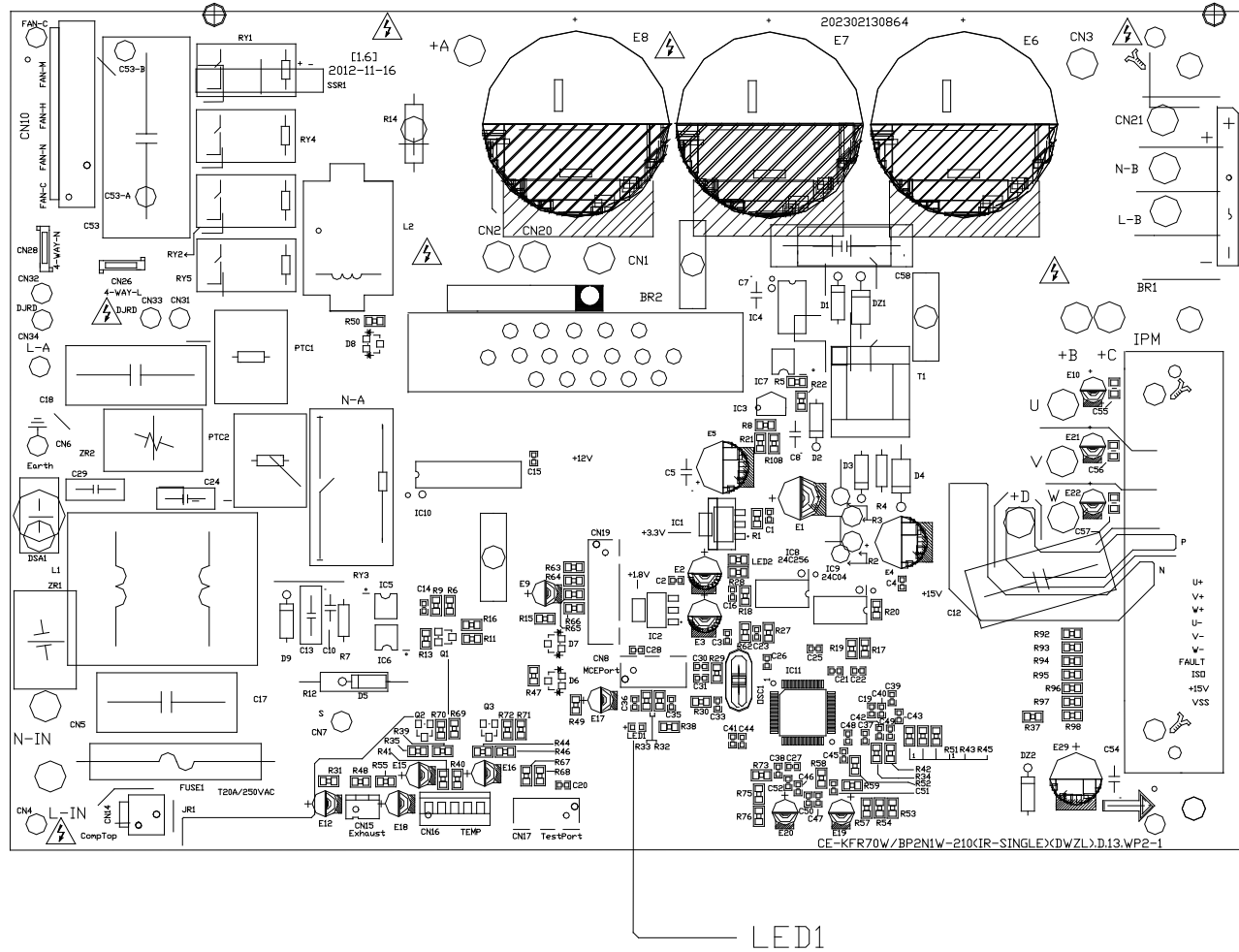
A-DVC09SD-0, A-DVH09SD-0, A-DVC12SD-0, and A-DVH12SD-0



LED1

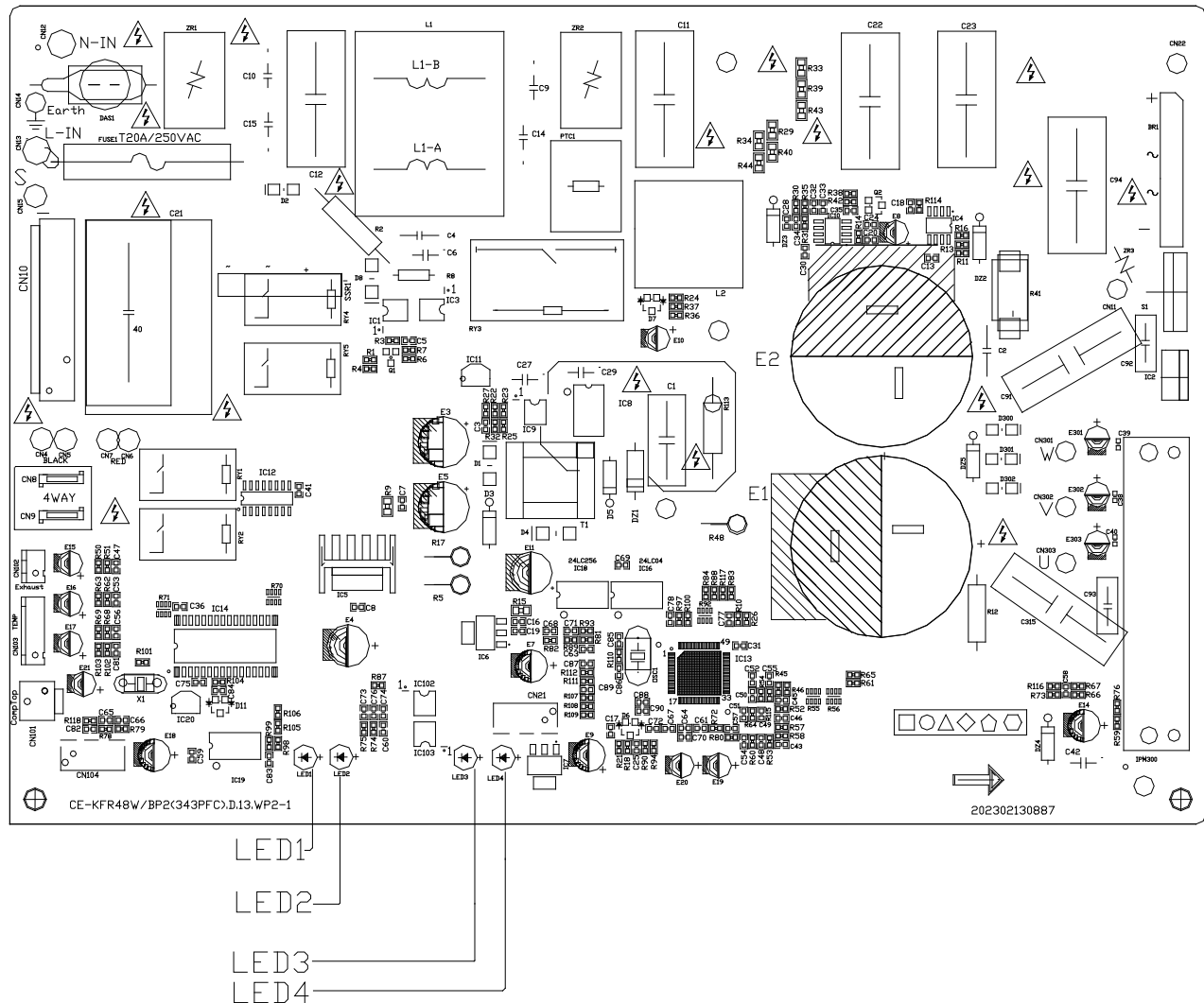
LED1 is Blue. Slow flash = Standby Mode. Fast flash = Error.

A-DVC24SD-1, A-DVH24SD-1



LED1 is Blue. Slow flash = Standby Mode. Fast flash = Error.

DVC18SD-1 and DVH18SD-1



This board contains four LED lights, shown above. (This image is for reference only).

- **LED1 is Red** and signals PCB Power by a solid light when the unit is operating or in standby mode.
- **LED2 is Yellow**, which will flash slowly when the unit is in standby mode and remain solid when the unit is in operation. If this light flashes fast, there is an error.
- **LED3 is Red** and **LED4 is Green**. These LEDs are both controlled by the compressor drive chip. See the following chart for more information on how these lights correspond with the indoor unit error codes.

DVC18SD-1 and DVH18SD-1 LED3 and LED4 Error Codes:

KEY: ☆ = Flashing Light X = Light is Off O= Solid Light is On

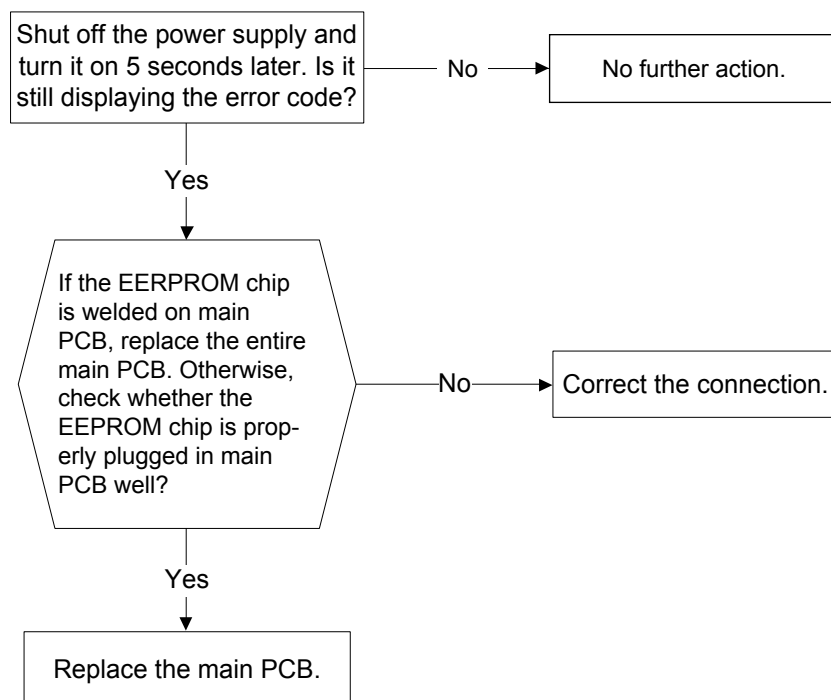
No.	Error	LED4 (Green)	LED3 (Red)	Indoor Unit Display
1	Standby (Normal Operation)	O	X	N/A
2	Operating Normally	X	O	N/A
3	IPM malfunction or IGBT over-strong current protection	☆	X	P0
4	Over voltage or too low voltage protection	O	O	P1
5	Over voltage or too low voltage protection	O	☆	P1
6	Inverter compressor drive error	X	☆	P4
7	Inverter compressor drive error	☆	O	P4
8	Inverter compressor drive error	☆	☆	P4

10.3 Diagnosis and Solution

10.3.1 EEPROM Parameter Error Diagnosis and Solution (E0/F4)

Error Code	E0/F4
Malfunction	Main PCB chip is not receiving feedback from EEPROM chip (Indoor/Outdoor)
Possible Causes	<ul style="list-style-type: none"> ● Installation error ● Faulty PCB

Trouble shooting:



EEPROM: Has a read-only memory, whose contents can be erased and reprogrammed using a pulsed voltage. For the location of EEPROM chip, please refer to the representative photos below.



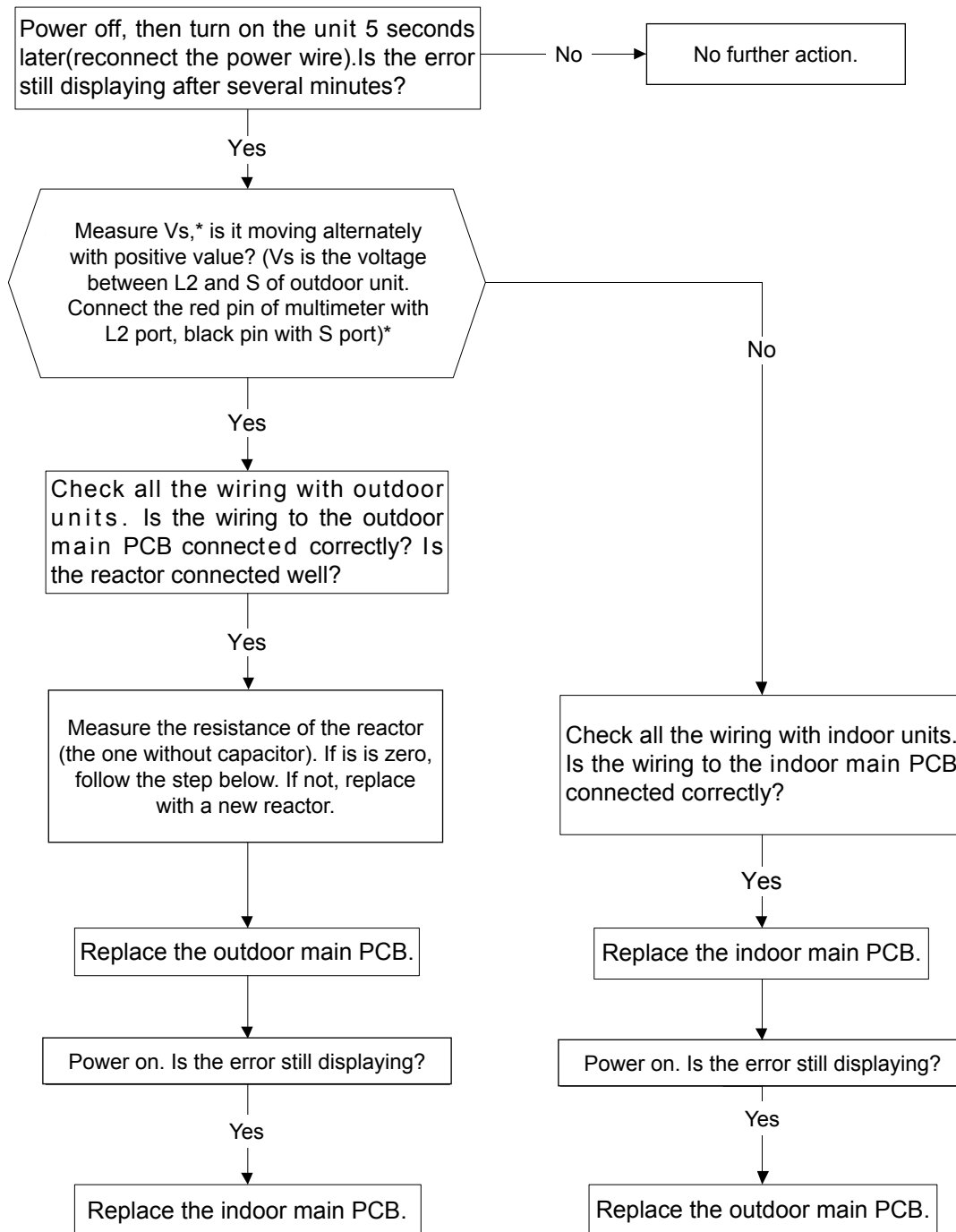
Indoor PCB



Outdoor PCB

10.3.2 Indoor / Outdoor Unit Communication Error Diagnosis and Solution (E1)

Error Code	E1
Malfunction	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens four times continuously.
Possible Causes	<ul style="list-style-type: none"> • Wiring error • Faulty Indoor/Outdoor PCB

Trouble shooting:

***Note:** See next page for masuring Vs and the resistance of the reactor.

**Remark:**

Use a multimeter to test the DC voltage between the L2 and S terminals of the outdoor unit.

The red pin of the multimeter should connect to L2 terminal while the black pin is for the S terminal.

When the unit running normally, the voltage will alternate between -50V to 50V.

If the outdoor unit has a malfunction, the voltage will alternate with positive voltage values.

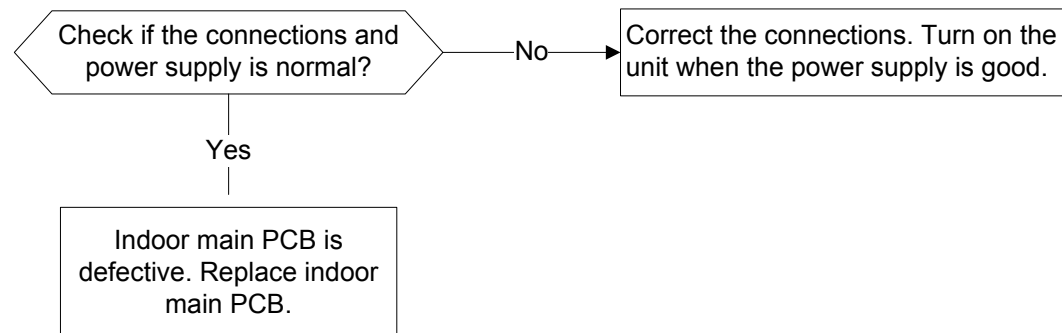
If the indoor unit has malfunction, the voltage will be a constant value.

**Remark:**

Use a multimeter to test the resistance of the reactor (which does not connect with the capacitor). The normal value should be around zero ohms. Otherwise, the reactor has malfunctioned and needs to be replaced.

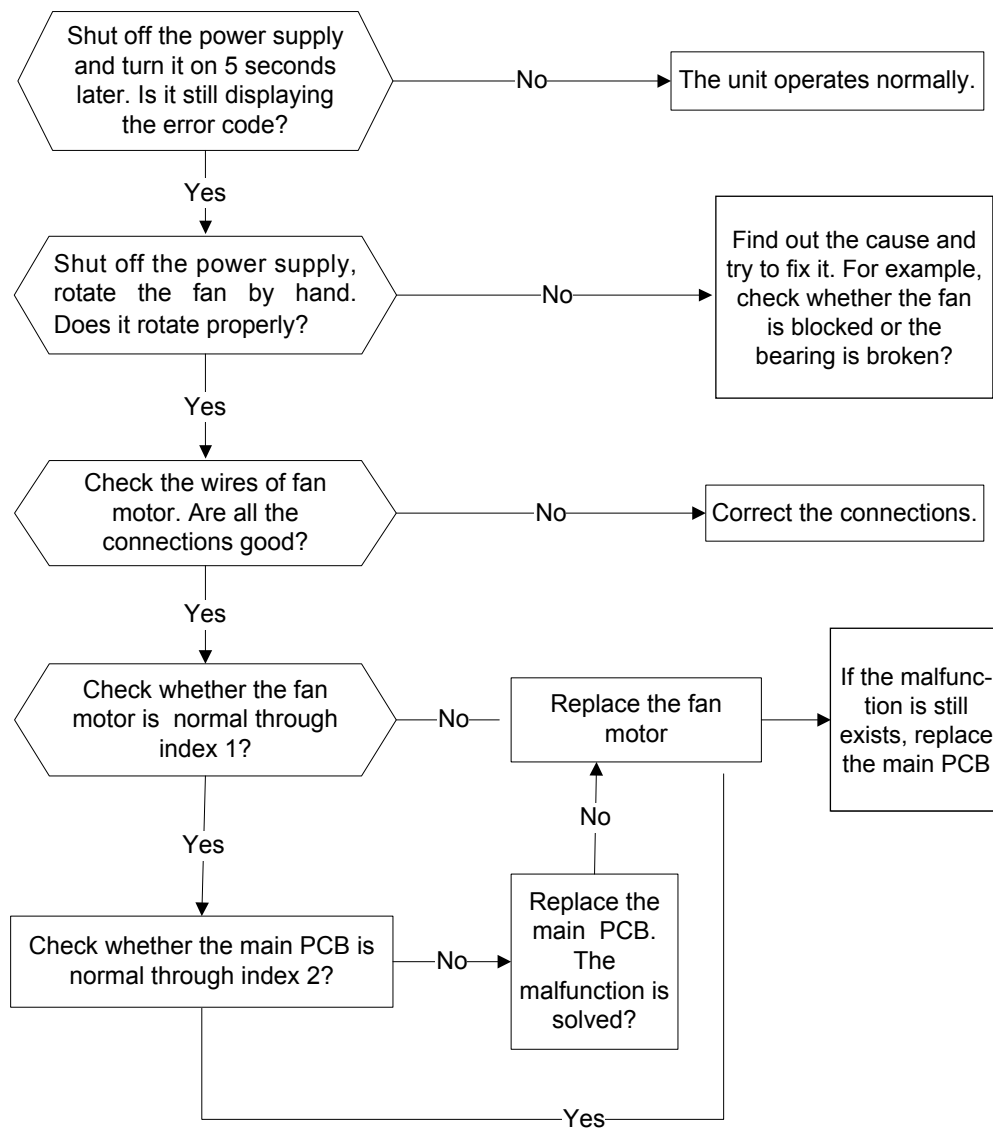
10.3.3 Zero Crossing Detection Error Diagnosis and Solution (E2)

Error Code	E2
Malfunction	When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.
Possible Causes	<ul style="list-style-type: none"> ● Connection Error ● Faulty PCB

Trouble shooting:

10.3.4 Fan Speed is Out of Control Diagnosis and Solution (E3)

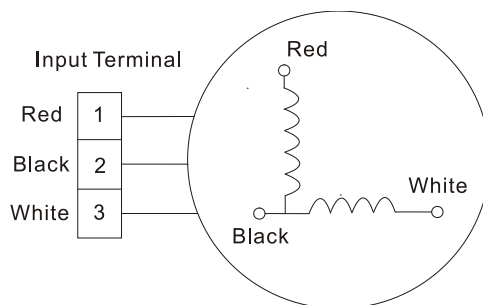
Error Code	E3
Malfunction decision conditions	When indoor fan speed runs at 300RPM or lower for certain period of time, the unit will stop and the LED will display the failure.
Possible Causes	<ul style="list-style-type: none"> • Wiring error • Faulty Fan Assembly • Faulty Fan Motor • Faulty PCB

Trouble shooting:

Note: See next page for information pertaining to Index 1 and 2.

10.3.4 Index 1: Indoor AC Fan Motor

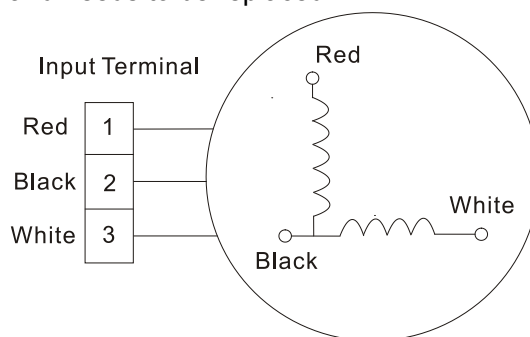
Measure the resistance value of each winding by using the tester.



Position	Resistance Value					
	RPG13B	RPG15A	RPG20B	RPG28H	RPG45B	
Black - Red	530Ω±8% (20℃/68°F) (Brand: Weiling)	75Ω±8% (20℃/68°F) (Brand: Weiling)	381Ω±8% (20℃/68°F) (Brand: Weiling)	183.6Ω±8% (20℃/68°F) (Brand: Weiling)	112Ω±8% (20℃/68°F) (Brand: Weiling)	118.5Ω±8% (20℃/68°F) (Brand: Dayang)
White - Black	315Ω±8% (20℃/68°F) (Brand: Weiling)	150Ω±8% (20℃/68°F) (Brand: Weiling)	267Ω±8% (20℃/68°F) (Brand: Weiling)	206Ω±8% (20℃/68°F) (Brand: Weiling)	82Ω±8% (20℃/68°F) (Brand: Weiling)	78.5Ω±8% (20℃/68°F) (Brand: Dayang)

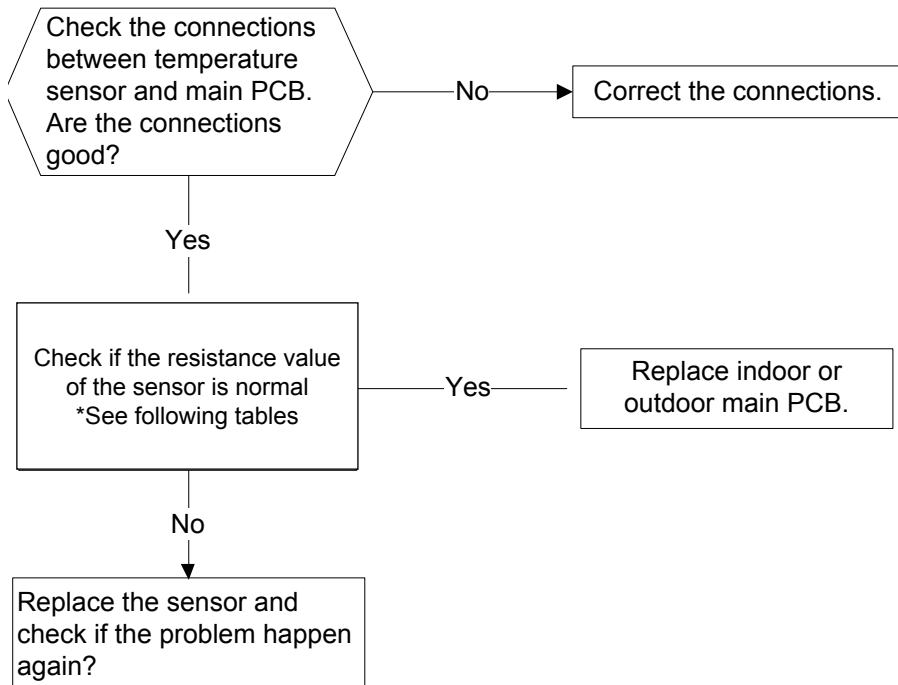
10.3.4 Index 2: Indoor AC Fan Motor

Power on and set the fan speed to high. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V (208~240V power supply) or 50V (115V power supply), the PCB is defective and needs to be replaced.

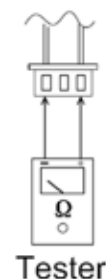


10.3.5 Open or Short Circuit of Temperature Sensor Diagnosis and Solution (E5)

Error Code	E5
Malfunction	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the this error code.
Possible Causes	<ul style="list-style-type: none"> • Wiring Error • Faulty Sensor

Trouble shooting:

Disconnect the temperature sensor from PCB, measure the resistance value of each winding by using the multi-meter.

**Temperature Sensors:**

- T1:** Room Temperature Sensor
- T2:** Indoor Coil Temperature Sensor
- T3:** Outdoor Coil Temperature Sensor
- T4:** Outdoor Ambient Temperature Sensor
- T5:** Compressor Discharge Temperature Sensor

T1, T2, T3,T4 Temperature Sensor Resistance Value Table

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

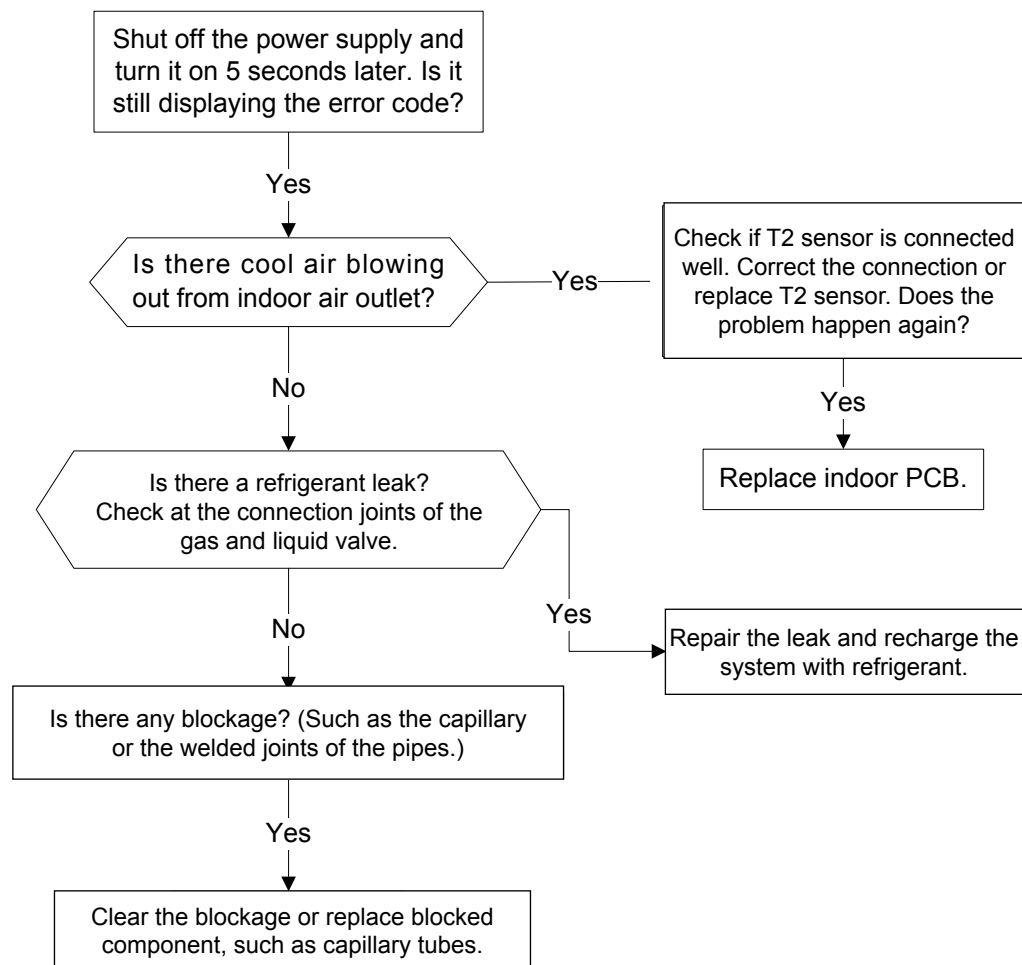
T5 Temperature Sensor Resistance Value Table

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			

10.3.6 Refrigerant Leakage Detection Diagnosis and Solution (EC)

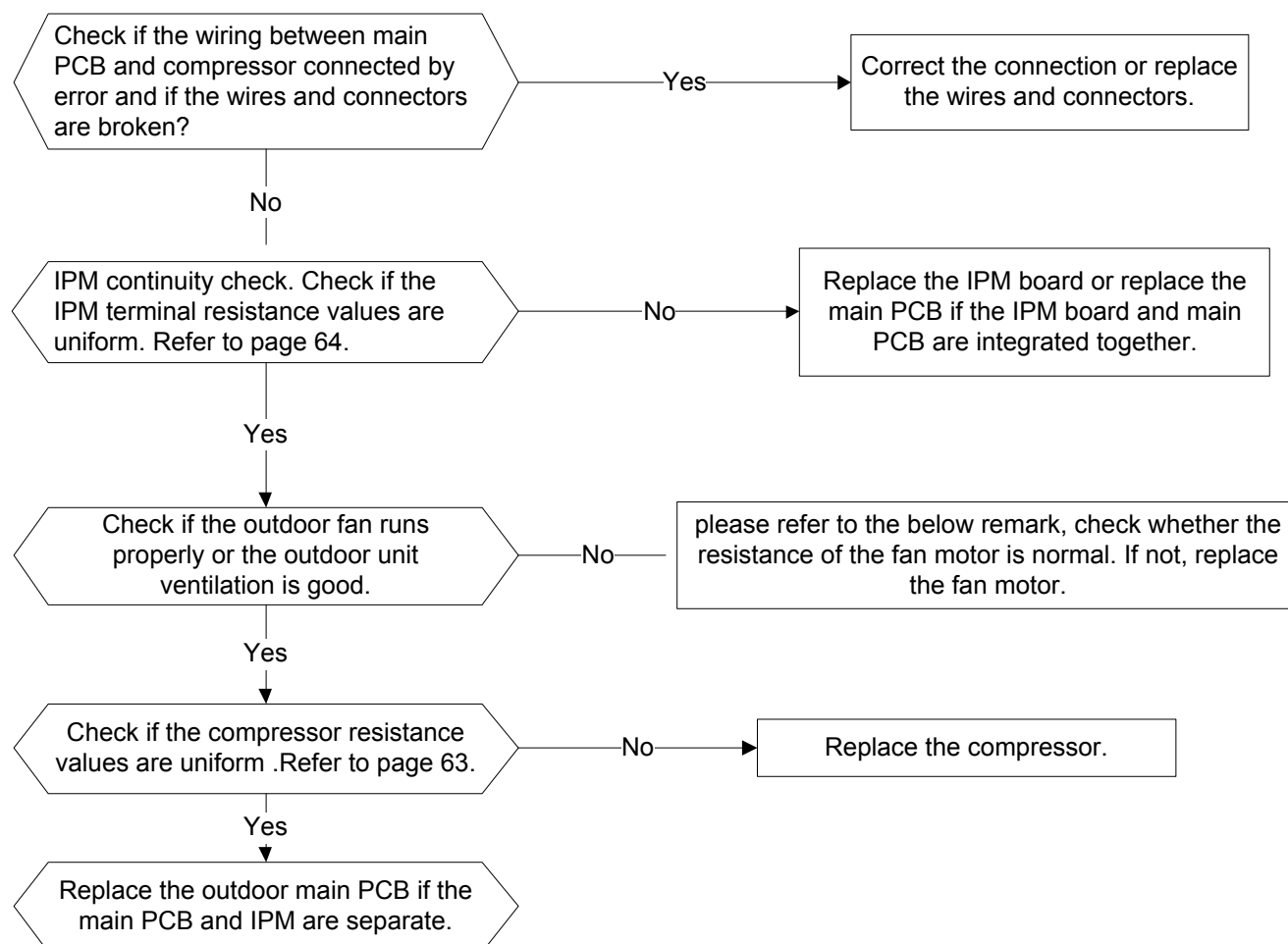
Error Code	EC
Malfunction	<p>In the first 5 minutes that the compressor starts up, if the temperatures do not remain a constant function where $T2 < (T_{cool} - 2)$ for 4 seconds and occurs 3 times, the display will show error code “EC” and unit will turn off.</p> <p>T2 is the Indoor Coil Temperature Sensor</p> <p>Tcool is the temp when the compressor first begins to run.</p>
Possible Causes	<ul style="list-style-type: none"> ● T2 Sensor faulty ● Indoor PCB Faulty ● Refrigeration Circuit problems, such as gas leakage or blockages.

Trouble shooting:



10.3.7 IPM Malfunction or IGBT Over Current Protection Diagnosis and Solution (P0)

Error Code	P0
Malfunction decision conditions	When the voltage signal that IPM sends to compressor drive chip is abnormal, the display LED will show “P0” and unit will turn off.
Possible Causes	<ul style="list-style-type: none"> ● Wiring error ● IPM malfunction ● Outdoor Fan Assembly faulty ● Compressor Malfunction ● Outdoor PCB Faulty

Trouble shooting:

10.3.7 Index: IPM continuity check

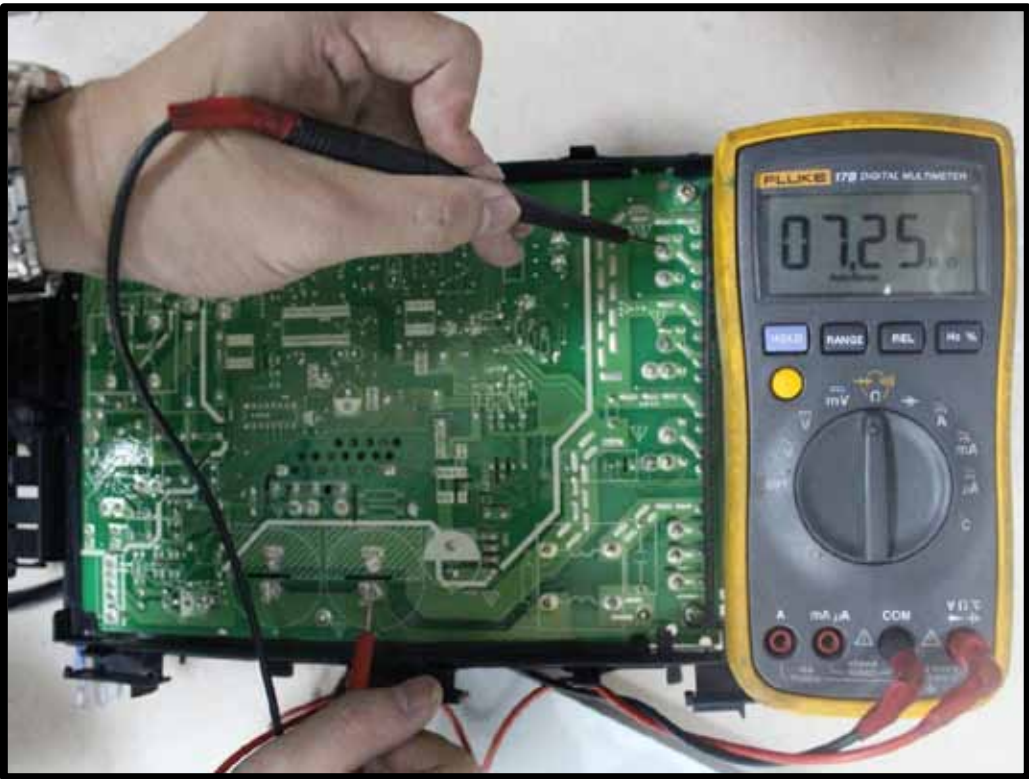
Turn off the power, let the electrolytic capacitors discharge completely, and dismount the IPM.

Use a digital tester to measure the resistance between P and U,V,W,N; U,V,W and N.

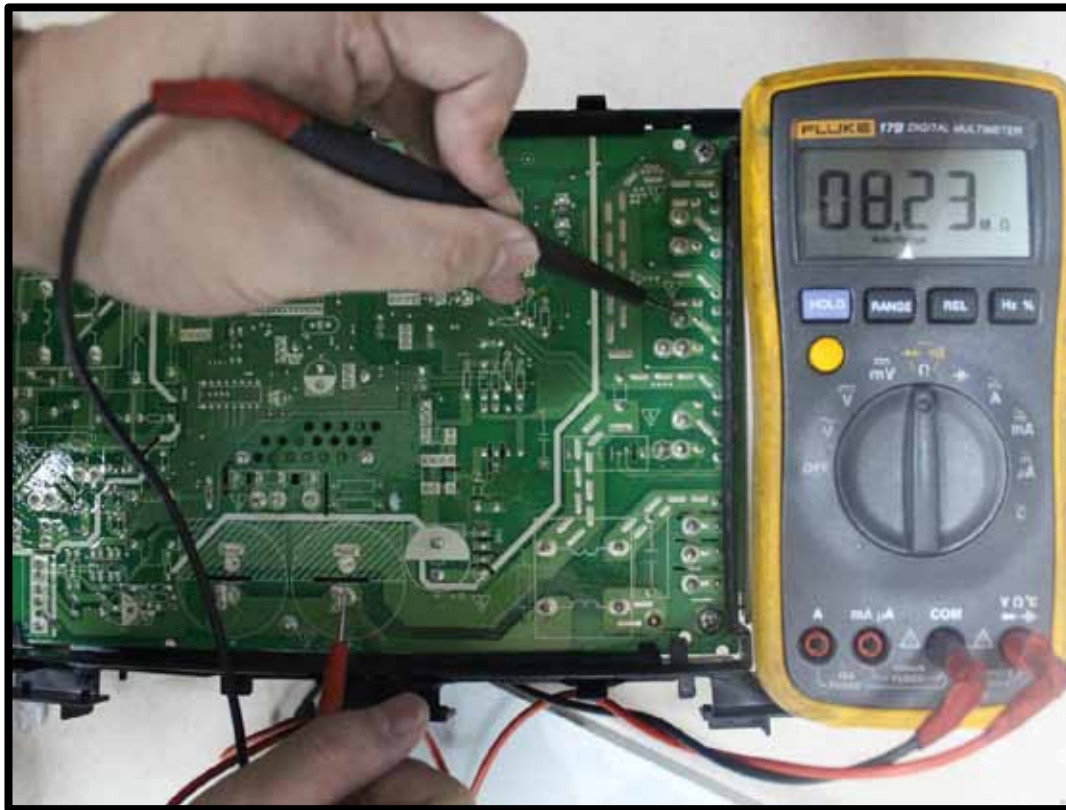
Digital tester		Normal resistance value	Digital tester		Normal resistance value
(+)Red	(-)Black	∞ (Several MΩ)	(+)Red	(-)Black	∞ (Several MΩ)
P	N		U	N	
	U		V		
	V		W		
	W		(+)Red		

Note:

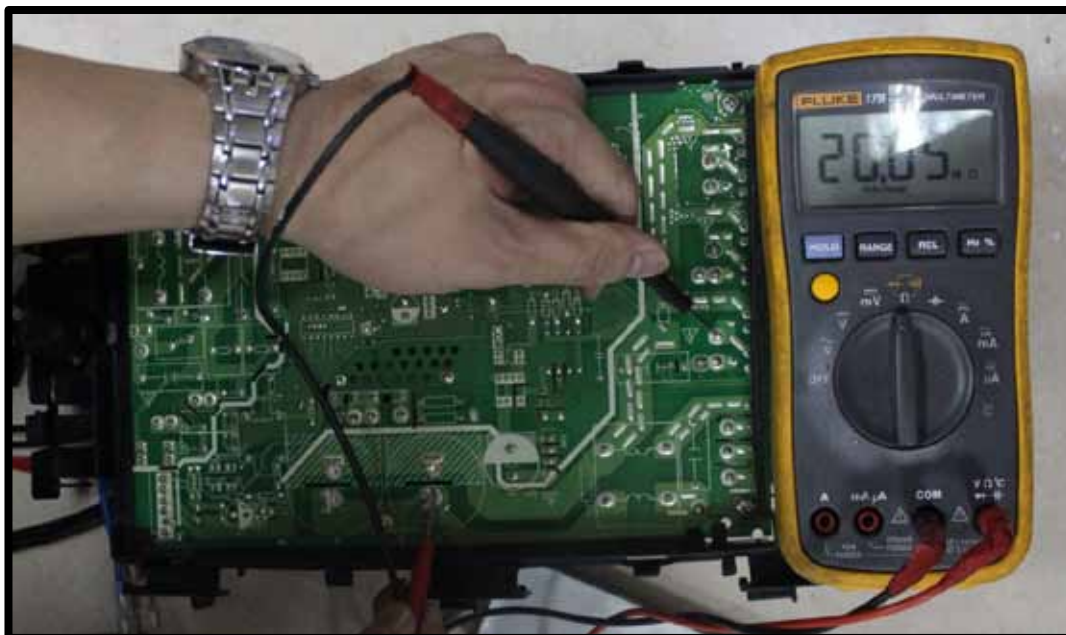
- 1) DVC09SD-0, DVH09SD-0, DVC12SD-0, DVH12SD-0 models:
Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **50 Ω** at 20 $^{\circ}$ C (68 $^{\circ}$ F)
- 2) DVC18SD-1 and DVH24SD-1 models:
Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **84.5 Ω** at 20 $^{\circ}$ C (68 $^{\circ}$ F)
- 3) DVC24SD-1 and DVH24SD-1 models:
Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **88.5 Ω** at 20 $^{\circ}$ C (68 $^{\circ}$ F)



P-U



P-V



P-W

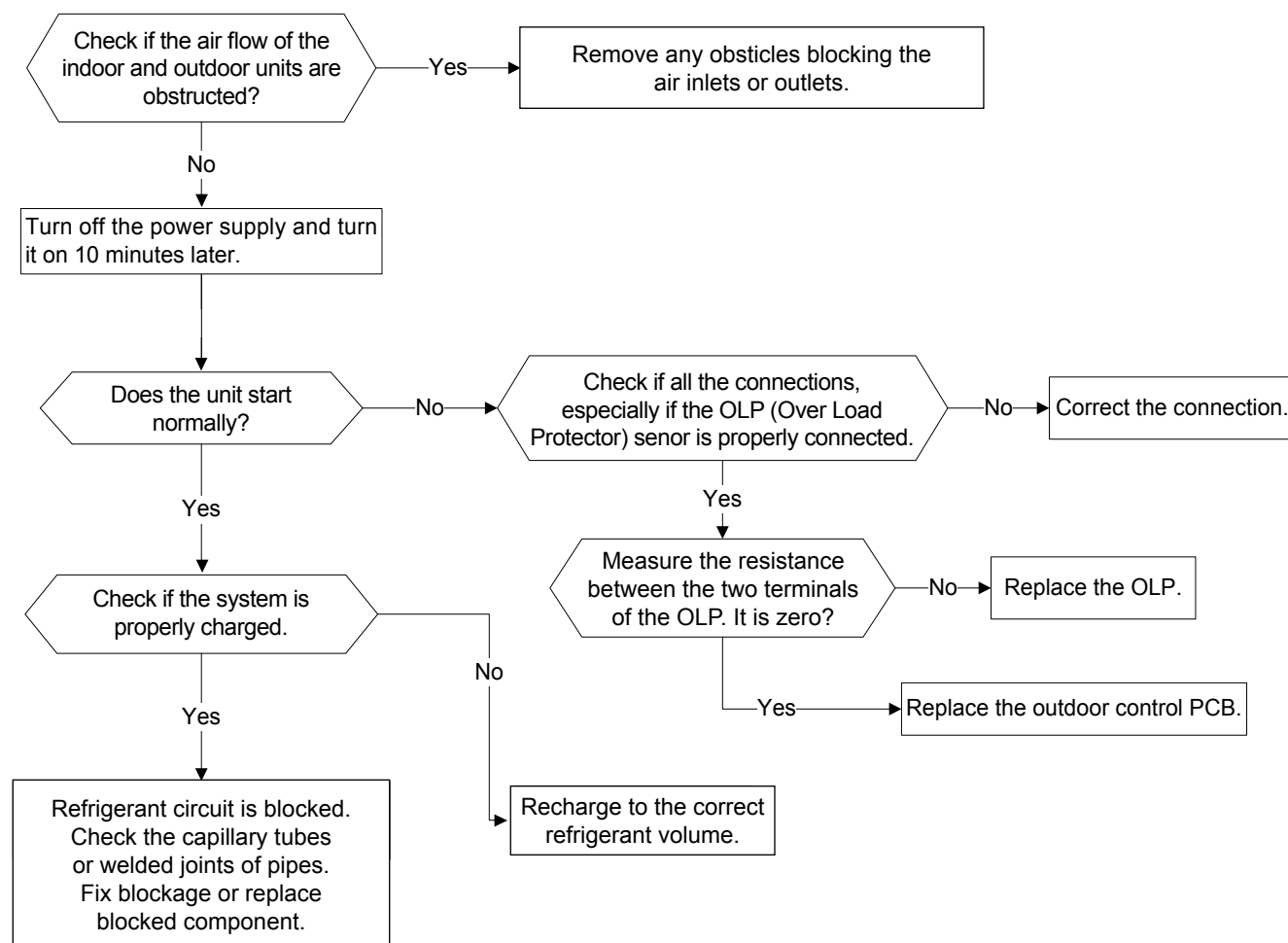


P-N

10.3.8 High Temperature Protection of Compressor Top Diagnosis and Solution (P2)

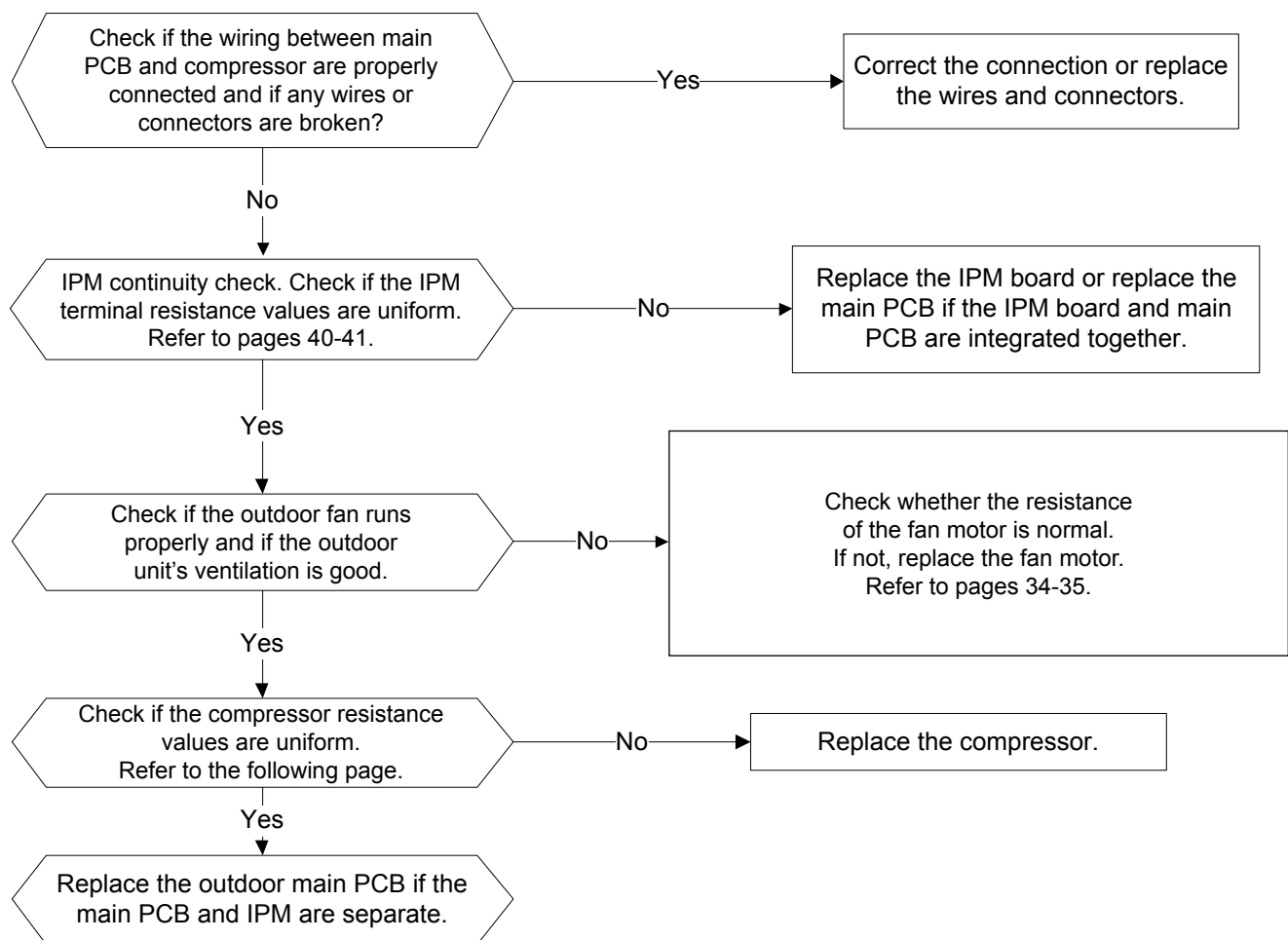
Error Code	P2
Malfunction	If the sampling voltage is not 5V, the LED will display the error.
Possible Causes	<ul style="list-style-type: none"> ● Power Supply Problems. ● Refrigerant Circuit leakage or blockage ● PCB Faulty

Trouble shooting:



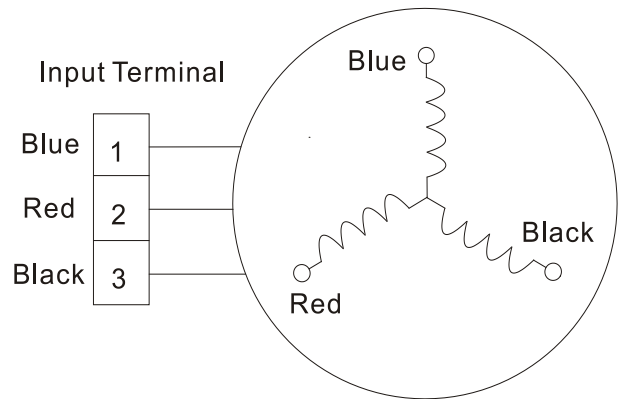
10.3.9 Inverter Compressor Drive Error Diagnosis and Solution (P4)

Error Code	P4
Malfunction decision conditions	An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, and compressor rotation speed signal detection, etc.
Possible Causes	<ul style="list-style-type: none"> ● Wiring mistake ● IPM Malfunction ● Outdoor Fan Assembly Faulty ● Compressor Malfunction ● Outdoor PCB Faulty

Trouble shooting:

10.3.9 Index: Compressor Resistance

Measure the resistance value of each winding by using the tester.



Position	Resistance Value		
	DA108X1C-23EZ	DA130M1C-31FZ	DA150S1C-20FZ
Blue - Red	1.1Ω	1.77Ω	0.95Ω
Blue - Black	(20°C/68°F)	(20°C/68°F)	(20°C/68°F)
Red - Blue			



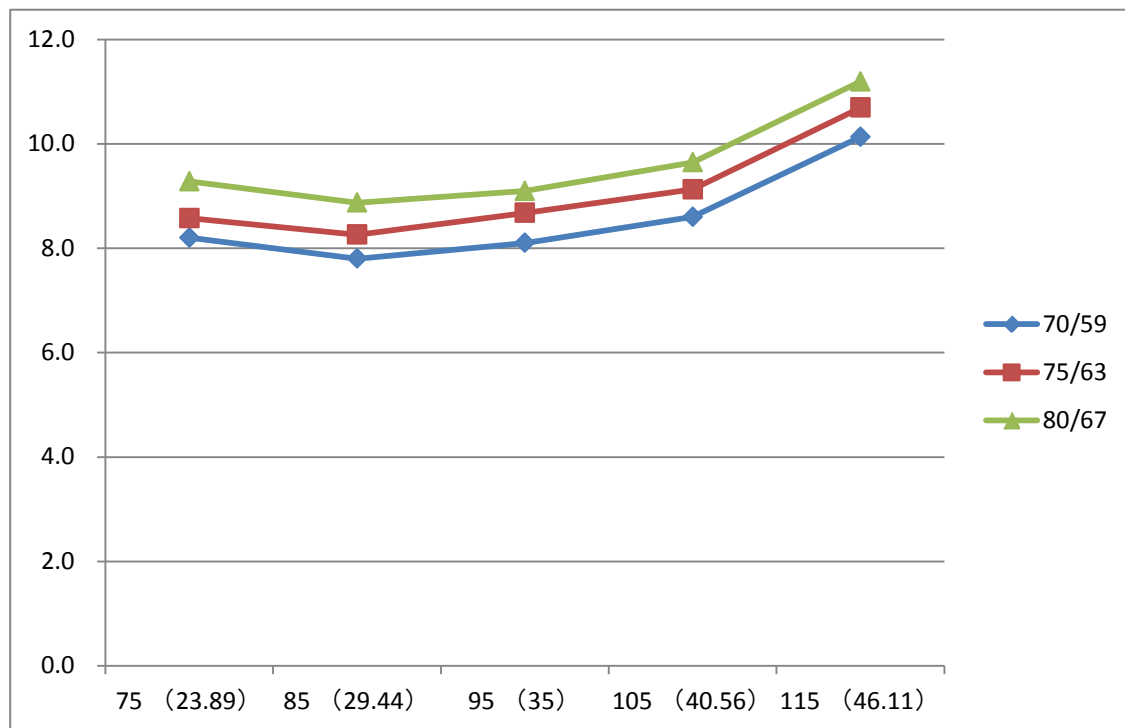
10.4: Pressure on Service Port

10.4.1 Cooling:

°F (°C)	IDT ODT	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)
BAR	70/59	8.2	7.8	8.1	8.6	10.1
BAR	75/63	8.6	8.3	8.7	9.1	10.7
BAR	80/67	9.3	8.9	9.1	9.6	11.2

°F (°C)	IDT ODT	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)
PSI	70/59	119	113	117	125	147
PSI	75/63	124	120	126	132	155
PSI	80/67	135	129	132	140	162

°F (°C)	IDT ODT	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)
MPA	70/59	0.82	0.78	0.81	0.86	1.01
MPA	75/63	0.86	0.83	0.87	0.91	1.07
MPA	80/67	0.93	0.89	0.91	0.96	1.12

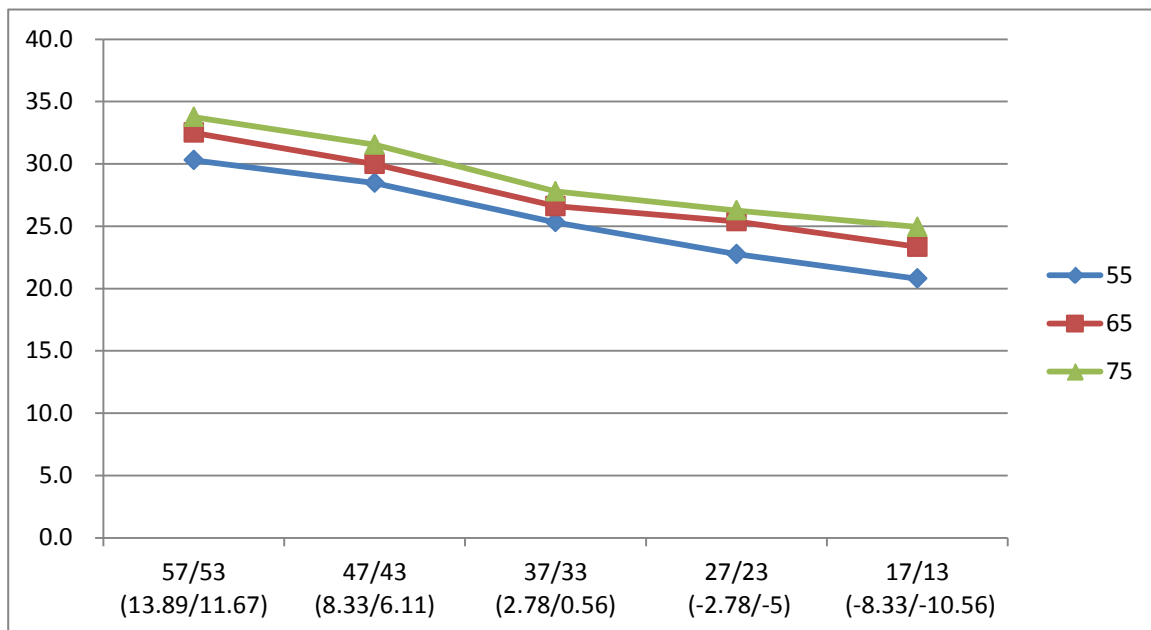


10.4.2 Heating Chart:

°F (°C)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
BAR	55	30.3	28.5	25.3	22.8	20.8
BAR	65	32.5	30.0	26.6	25.4	23.3
BAR	75	33.8	31.5	27.8	26.3	24.9

°F (°C)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
PSI	55	439	413	367	330	302
PSI	65	471	435	386	368	339
PSI	75	489	457	403	381	362

°F (°C)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
MPA	55	3.03	2.85	2.53	2.28	2.08
MPA	65	3.25	3.00	2.66	2.54	2.33
MPA	75	3.38	3.15	2.78	2.63	2.49



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HEAT CONTROLLER

Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.



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